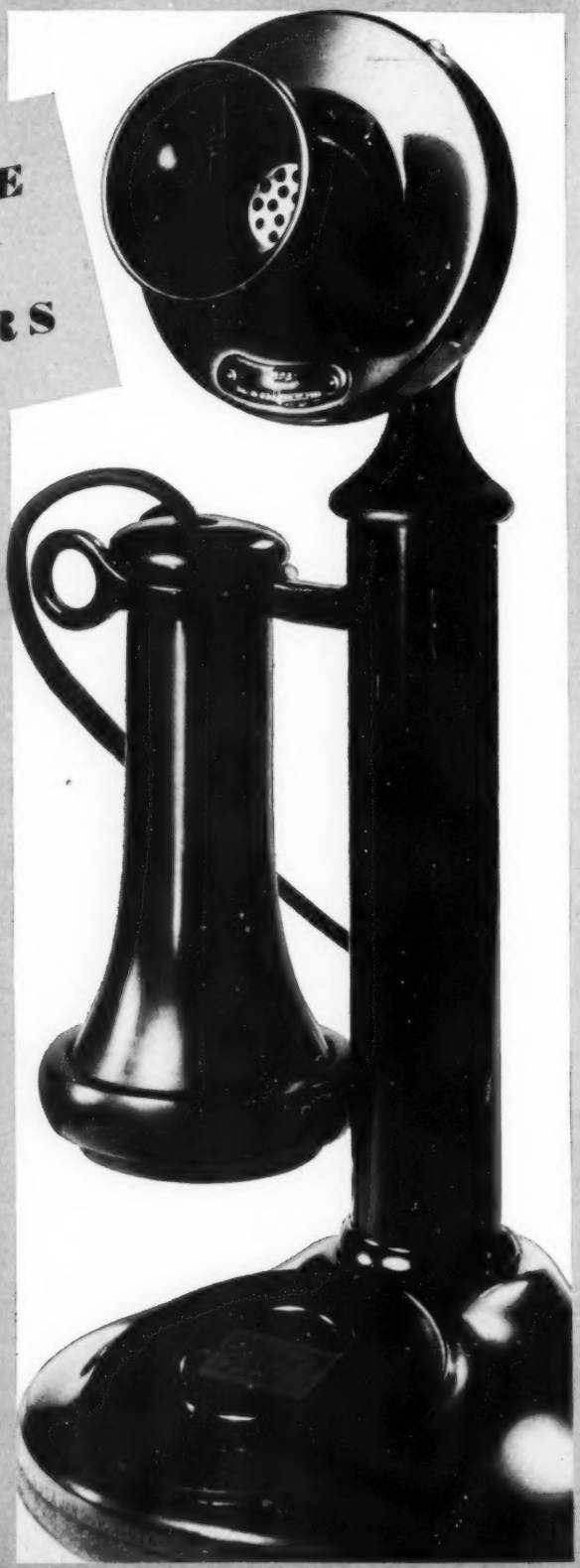
AMERICAN FORESTS

Tennessee Valley Number

October 1933

GOOD SERVICE THROUGH TRYING YEARS



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BELL TELEPHONE SYSTEM

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AMERICAN FORESTS

OVID BUTLER, Editor
L. M. CROMELIN and ERLE KAUFFMAN, Assistant Editors

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At the headwaters of the Little Pigeon River in Smoky Mountain National Park--a study in contrasting lights and shadows as the rapids drop into fascinating pools, reflecting the beauty of the white rhododendrons lining the banks of the stream. Photograph by Carlos C. Campbell.

Member A. B. C.
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CHARACTER STUDIES OF THE OLDER GENERATION OF MOUNTAIN FOLK

Just above is Mrs. James Watson. Her mountain cabin is near Gatlinburg, Tennessee. Sixty-five years old, she spins wool for the weavers at the Pi Beta Phi School there, and is shown here operating the old style spinning wheel.

A mountain type

Below—The shining interior of the home of Harriet Hankins, who is seventy-three years old. It is at the site of the planned community, near Norris Dam.

The mountain folk are good-natured, cheerful people,—always friendly and hospitable.

"MORE THAN BUILDING A DAM"

The New Economy of the Tennessee Valley is the Building of Human Opportunities Anchored in the Natural Resources

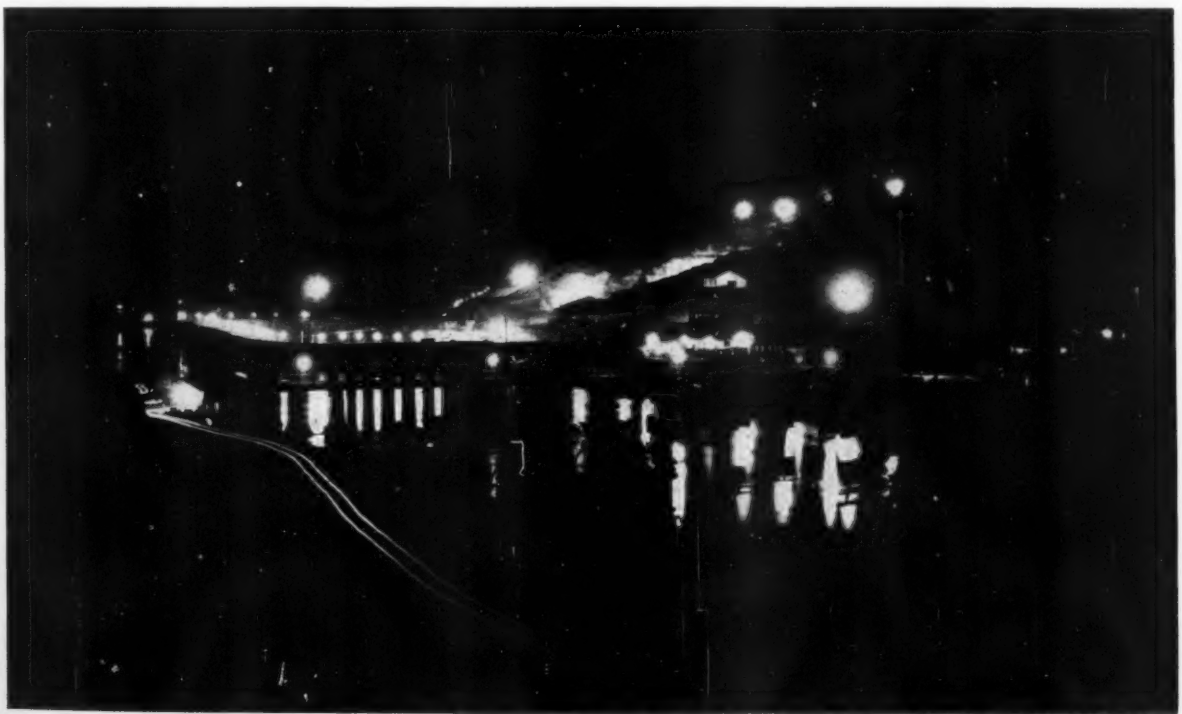
By ARTHUR E. MORGAN
Chairman, Tennessee Valley Authority

AS PEOPLE find old methods and old conditions producing disaster, they naturally explore for new methods and new ways. That exploration is experiment, and its direction will be affected by the genius of the leadership of the time. Those who are comfortably situated according to the old regime may object to exploration and experiment. Those who find life hard and unendurable, or who have imagination as to its greater possibilities, will insist on exploration and experiment, and if times continue rigorous and if imagination continues active, that tendency to explore and experiment will not be entirely thwarted.

It was inevitable under the circumstances that there should come about some expression of the widespread craving for more effective and orderly ways of living and of organizing our social and economic life. But that the Tennessee Valley should be chosen as an area for experiment, that a particular body like the Tennessee Valley Authority should be created, that it should be given certain very specific powers, certain very specific functions, that it should be given, in addition, other general functions of general exploration and experiment and demonstration, that, I believe, was not inevitable in the situation. It grew out of the genius of political leadership.

It seems to me almost a political accident that the man who was brought to the front of our national life at our great crisis should be a man of great social background and imagination. He might have been aggressive, that aggressiveness might have carried only to purely economic processes. So far as public discrimination was concerned before our last national election, by accident of personality or drift of circumstances, it might have chosen less far-seeing leadership. The fact that our President does have interest over a wide range, that he is fundamentally a planner, that, it seems to me, is over and beyond what the public consciously asked for. It is because our political leader happened to be a man of imagination, a man who thinks in terms of planning that the Tennessee Valley Authority is in existence today in its present form.

President Roosevelt was determined that the hydroelectric project at Muscle Shoals should reach fruition; that it should be supported by additional developments.



Photographed by E. P. Morris

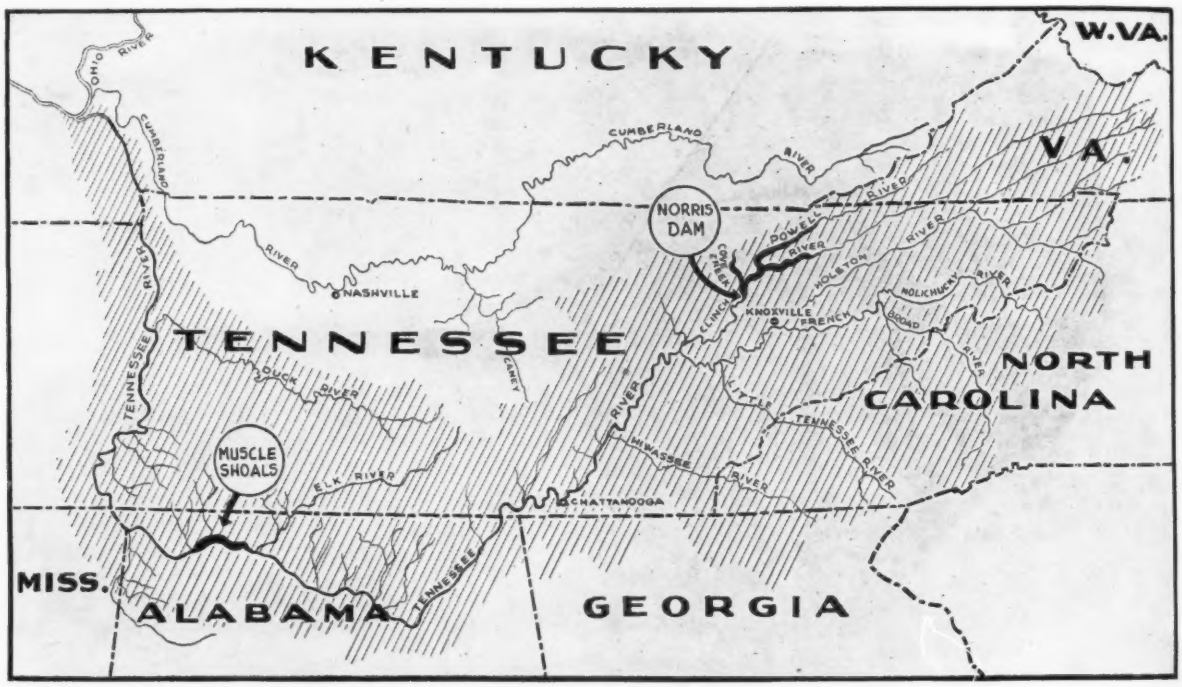
A Night Scene at the Site of the Norris Dam.

He was interested that the fertilizer project should go ahead, but all that might have been carried through as the sole purpose and intent of the legislation. The President, however, did not rest there. In his message to Congress forecasting the bill for the Tennessee Valley Authority, he said that the great development at Muscle Shoals was only a minor part, that he looked forward to a project for bringing industrial and social order out of the haphazard growth that had characterized our national life and that he hoped this region might be a case in which methods and policies might develop, with the prospect that if they should develop soundly and successfully here, these same policies might have wider application in other parts of the country.

The Tennessee Valley Authority Act defines two or three very specific purposes and gives quite definite instructions for their fulfillment. One of these is the distribution and sale of electric power. It is the opinion of President Roosevelt, I believe, that it probably would not be wise for the public to generate all the power in the United States. Within the last two years he has expressed himself to that effect. He believes, however, that the public utility business, so far as power is concerned, has not always been wisely handled; that there has been mismanagement; that there has been over-capitalization; that there has been undue political influence. There have been a good many methods that ought to be eliminated from large-scale industries in the United States. He has suggested that there be set up what he called a "yard stick" for power, an example of public ownership in generation, transmission, and distribution, where all the factors could be in evidence, where there could be complete and unquestionable fair analysis and records so that the public might discover, perchance, what is actually the necessary cost of power, and whether the public in reality can handle projects as effectively as private industry.

It was the attitude of the President, and it is the attitude of the Board of Directors of the Tennessee Valley Authority, that existing investments in electric power utilities should not be unnecessarily disturbed; that existing values should be recognized. And so it has been the policy of the Tennessee Valley Authority in acquiring an area in which to use this "yard stick," so far as possible to come to amicable settlement with those who at present occupy the area.

We have to date purchased considerable area and considerable plant and equipment from one of the large power organizations of the country. We are now distributing that power. The first municipality to use Tennessee Valley Authority power is the City of Tupelo, Mississippi. We have established rates there that are somewhat less than half of the rates formerly paid. The Tennessee Valley Authority is selling power to the city of Tupelo at a rate which seems to be fair and reasonable and adequate for taking care of all charges such as would be proper for a private utility to sustain, including taxes.



This map shows a general outline of the Tennessee River Basin, including the site of the Norris Dam in relation to Muscle Shoals. The shaded area indicates the sphere of development by the Tennessee Valley Authority.

The average consumption in the Valley area at present is about fifty kilowatt hours per month. We believe it should be about three or four times that much and that by having lower rates available and by having lower priced equipment available a very great increase of use will take place. That is an extremely brief statement of our power program.

In the matter of fertilizer, the Tennessee Valley Authority inherited from the old war plant at Muscle Shoals two nitrate plants called 1 and 2. The law delegates the Authority to try out methods of making fertilizer,

nitrate or other fertilizer ingredients, and we have been actively at work in research and development for that purpose. We believe that it would perhaps not be a wise policy to undertake to manufacture nitrates at Muscle Shoals though we are not entirely settled in that opinion. The reasons are two. First, since these plants were erected, very great progress has been made in the development of nitrates, and it seems that the technique in the manufacture of nitrate is pretty well up to date and that there is little new scientific territory that can be quickly occupied toward reduction of cost. The second reason is that the farmers can raise their own nitrates by planting leguminous crops. The plant food phosphate, however, is not available in the same way. We have no way to get it except to produce it as from phosphate-bearing rocks. The lands of the South, especially the uplands, are very short in phosphate. The opportunity for improvement of the technique is much greater in the field of phosphates than in the field of nitrates. So the Tennessee Valley Authority is actively at work in a study of the development of phosphate fertilizer. We have two plants under construction. We are mining phosphate rock, and within a few months we expect to be manufacturing phosphate fertilizer on an experimental scale in an effort to develop less expensive methods of manufacture. We may also explore less expensive methods of distribution.

Examinations to determine special fitness for differing phases of the work were given to 38,000 young men living in the Valley. They were rated on their ability to work with both head and hands. The success of this effort is attested by the high order of intelligence of the labor forces at Norris Dam.

A new economy is being created out of the abundance of raw material at hand, and by the virile population of the Tennessee Valley, which the author says is eagerly grasping the opportunities offered.

The same law which proposed the generation and sale of power at Muscle Shoals by the Government, authorized the construction of the Cove Creek or Norris Dam on the Clinch River. The Wilson Dam power plant at Muscle Shoals taken by itself alone is not a profitable investment because there is very little storage in the river above, and while in high water there is

a very great supply of power, when the river is low that power drops off. The power that is available for only part of the year has relatively little value, and for that reason the Muscle Shoals plant, taken by itself, is not a profitable investment.

On the Clinch River at Norris Dam we have another power project of a very different sort. There we have one of the greatest storage reservoirs in the world coming into being with a storage capacity of 3,000,000 acre feet. We can store the average year's flow of the river above that power plant, a drainage area of 2,000 or 3,000 square miles. With Norris Dam constructed it will be possible to store up water in Norris Reservoir throughout most of the year, then when the river below is very low, to generate power at Norris Dam at the time power is most needed. When that water has passed by Norris Dam, it will flow down to Wilson Dam at Muscle Shoals and go through that power plant also. We may use the entire year's flow of the river, possibly, in two or three months by letting it out just when needed. In that way we can raise the prime or dependable power at Muscle Shoals from 25,000 or 35,000 kilowatts to 105,000 kilowatts. This represents the value Norris Dam can add to Muscle Shoals and to every plant down the river below Norris Dam. And there is room down the river for about eight power plants.

That same necessity for coordinating development extends throughout the Tennessee River system. Ultimately, it will be possible to develop four million horsepower from the Tennessee River system. Possibly half of that will be along the main river; possibly the other half will be on the headwaters; but the reason such a large amount can be developed is that we can develop the headwaters and lower plants as one unit. By doing that, we can possibly cut in two the cost of producing hydroelectrical power. And so we hold that the development of the water power of the Tennessee River ought to be a single integrated project and not a series of unrelated projects.

The Norris Dam is being built for power development, but that is not an end in itself. We do not develop power just so there can be power development. We develop power to contribute to the well-being of the people in this region. It is only a means to an end. The object of building a dam is to provide power; the object of providing power is to raise economic and social conditions of a region. Why do we have to wait until the dam is finished before we improve the social and economic conditions of this region? Why not make the process of building the dam a part of the process of improving economic and social conditions? We are endeavoring to do that very thing.

Instead of calling in casual labor to build a dam in an ordinary way, we asked ourselves, "How can building a dam contribute to the improvement of social and economic conditions?" We have all through this region a great many people out of employment. Some of them have qualities of leadership; some of them do not. If we can gather together, while we are building this dam, the potential leadership of this region, if we can get them acquainted with economic and social methods and make it a better region to live in; if, when they go back home, they will have an education in a more effective economy and better developed habits, we shall have done more than just build a dam. In order to spread employment, as is usual on public works, we are working men only five and one-half hours a day, having four shifts. We are trying to fill part of the spare time of these young men with opportunities for education and training.

How did we find these young men? We picked out a half dozen common-sense people here in the region and had them go over the Valley county by county, and ask who were the potential young leaders, who were able, young, ambitious, of good moral character, who knew how to work, and had good families. Those six men brought back to us, in the course of time, thousands of names of potential leaders. Then we gave general notice in addition and gave examinations to about 38,000 young men. It was an examination fitted not to highbrows, but to people who are in the habit of working both with head and hands. Then we rated them and for our working staff at Norris we have been picking them out one by one, the cream of those young fellows, putting them to work. We are not imposing on them any discipline or any regimentation at all. We are simply providing opportunities, and, if the young man wants a chance, he can come voluntarily and enroll.

We have a variety of projects under way. We are building a small farm plant, a dairy barn and farm house, planting our crops for dairying, and organizing for a pasteurizing plant and for cheese making and butter making plants. We are trying to set up a small up-to-date establishment for producing milk and its products. We shall bring in milk from the surrounding country as well as from our own little herd. Our agents will offer to buy milk that will come up to our standard. So we are making an education of the production of milk in that region.

We have market gardens growing. We have an egg-producing establishment. We are training young men in carpenter work, such as repairs on farm buildings; in mechanical work, such as repairs on farm equipment and farm tools. We are running a small blacksmith shop. We are trying to make them acquainted with the technique of the farm. Others want to do other things, and we are training them for other callings.

The foreman has a strategic place in industry. He is the liaison between labor and management. In the past foremen grew up, as a rule, and if they happened to have the ability to superintend, they might in course of time get their opportunity. We are trying to pick out the best young men and are circulating them around on jobs so that in the course of a few years we shall have foremen of a new quality. We have the best foremen training these young men. We are trying at the same time to get them acquainted with labor relations, with what a foreman ought to be as a friend of his men; as an interpreter of the purpose of the job, of the man, and of the needs of the men and managers. We are trying to develop a new type of foreman.

We have a body of young men that are heart and soul interested in the work—a clean-cut lot of fellows—men who are anxious to do the job. There is a good morale and very little loafing. They have been told, and they believe it, that they are a part of the New Deal. If they can produce electric power cheaper they can have it in their houses cheaper; if they can build homes for working men cheaper, more working men can have homes. And no outsider is making any profit out of it; the people are getting the benefit of it. If they can do a good job, they are making it possible for the average man to get his share out of life. If they lay down on the job, they are undercutting the best opportunity they have had for a generation to work out a new order (*Continuing on page* 497)

© Hobart V. Roberts

BABES OF THE WILDWOOD

By

ARCHIBALD RUTLEDGE

IN BEAUTY and with the vividness of remembered joy they come back to me, the recollections I have of babes of the wildwoods. For more than forty years the manner of my life has permitted me to roam the wilderness in order to study the creatures of nature; and of rare appeal to me have been the young of wild things, especially of those things that have about them the unpremeditated grace of natural elegance. The heart has to have romance; and if we banish from our world by cold reason the gods and goddesses, the nymphs and dryads, we can still be fascinated, can still enjoy the innocent thrill of wonder and mystery if we look at these real pixies and fairies, these gnomes and elves — these charming babes in the woods. These infants, for example, can perform miracles before our very eyes.

© Vivian Akers

One day in late June, following an old sandy trail bordering a trout-stream that came cascading down a hemlock-hung gorge, just then dimly radiant with the glory of rosebays in full flower, above the crystal song of the joyous waters I heard a mother ruffed grouse give a startled call. Then she came into view, a vision of tawny grace, patrician in appearance and manner, her soft brown plumage blending beautifully with the faded pageantry of the old leaves carpeting the forest floor. She stood in a little arena, about thirty feet from me, under the ponderous shade of a group of great white oaks. The very picture of startled and solicitous motherhood, she glanced this way and that, her comely head held high, her liquid eyes gleaming with troubled love. Across the trail now ran the children for whose safety she was so concerned—twelve tiny grouse, smaller than little chickens just hatched, a dappled brown in color,—alert, swift, enigmatic in elusive charm. In a moment they had gathered about their beautiful mother, who, knowing more about danger than they, stood erect, apprehensive, while they frolicked in the leaves, piped in elvish trebles, played ring-around-the-rosy with fairy abandon.

When I took a few steps forward, the mother, now sure of her misgiving, gave the call of alarm. At the same time, trailing one wing as if she were wounded, she fluttered about pathetically, trying to draw the peril to herself and away from her babies. It is not alone in the human heart that mother love can be stronger than death or than the dread of death. I have seen that thrilling miracle many times among those creatures whom we choose to regard as inferior.

As soon as the mother grouse recognized me, she gave an especial cry that meant nothing but "Hide!" Instantly the chicks vanished. They did not run away. They simply

melted. The place in which they achieved total disappearance was fairly open. There were no dead logs or green vines. The old brown leaves were not drifted in windrows. Yet, though I spent twenty minutes on my hands and knees, assiduously searching, I found but two of the twelve tiny hiders. All the while their mother kept giving her plaintive note of alarm; and as long as she called, they remained "frozen."

These little grouse were not more than three days old; yet already they had learned the lesson of perfect obedience, and the consummate art of suddenly and perfectly secreting themselves. Of human babies we hardly expect obedience; and are glad enough to have it from grown-up children. Of course, in nature it is an inexorable law, conformity to which means life, disregard of which means death. Yet it is thrilling to observe with what cunning precision of instinct and intelligence even these fairy infants obey.

Withdrawing to a safe distance and hiding myself, yet keeping in clear view the place where the elves were hidden, I awaited developments. After a few minutes the mother's note changed; now she was calling her young to her. Then out of those same thin patches of brown leaves in which I had so carefully searched, joyously and confidently trooped the dapper pixies, tripping and pirouetting gaily over the woodland floor. As the happy family withdrew into the secrecy of the fragrant greenery, I heard the mother sweetly admonishing them, and praising them for having performed their part so well.

© James E. Stanley

Among wild creatures, the deer is perhaps my favorite friend; and during my roaming of their haunts, I have seen between five and six thousand in their native state. Many a fawn have I raised on the bottle; they make very gentle and affectionate pets.

Now, the wild deer mother, when she leaves her newborn baby and goes far away into the forest to feed, evidently tells him not to leave the place until she returns; for on a good many occasions, on finding fawns in the woods, I have noticed how reluctant they are to leave their beds. On one occasion, a fawn so young that he swayed on his long slender legs as he rose, came toward me as I approached his bed in the tall green broomsedge,—doubtless thinking me his mother! He showed not the least alarm, but came daintily over and, rubbing his starry flank against my leg, looked up with wide childish eyes.

One day a negro turpentine worker brought to me out of the wild pinelands a little fawn that he had caught. It proved to be a most obedient and intelligent pet. Except for a certain time of day, it followed me about everywhere, stood beside my chair at table, and slept on the foot of my bed at night. But from daybreak until about two o'clock in the afternoon it invariably went out to a little field of oats in front of the house and there lay down, remaining motionless until mid-afternoon. This was just what his mother had taught him to do; and he rigorously obeyed her all through his fawnhood days.

The wild deer commonly feeds only at night and during the twin eerie twilights of evening and dawn; but a doe will not leave her baby in the dark forest alone, so that as long as he is little and dependent, she feeds in the daytime.

Perhaps the most appealing of all the babes in the woods is such a little fawn. There is an old English superstition that if a fawn ever hears the human voice and feels the touch of the human hand, it will desert its own kind to follow man. This has some truth in it. At least, I never had any trouble in "gentling" a fawn. It makes the most interesting, affectionate, playful, and troublesome of pets. I say "troublesome" because the fawn can jump almost anything. You cannot keep both a fawn and flowers, especially geraniums. He will not only eat the stalks and flowers, but he will take the most childish delight—especially if he be a little buck—in pushing off with his head every flower-pot on a stand. I think he enjoys hearing the pots fall and break.

One day I was driving down a pineland road with a companion, who happened to have a gun. As we neared a woodsman's cabin a fawn dashed out of a thicket, jumped the road, and ran into the yard in front of the cabin. My friend sprang from the buggy with his gun. I warned him not to shoot so close to the house, and of course I didn't want him to kill the fawn. As we came up, the owner of the cabin met us, and we asked him about the young deer.

"Oh, that," he said; "that's the baby's pet. I expect it's under the dining-room table now. It always hides there when it gets scared. He and the baby sleep together," he added, his voice softening in affection. "The fawn sleeps on the floor, and the baby lies down beside it and puts its head on the fawn's flank. If the fawn wakes when the baby is still asleep, the fawn will not stir; but if the baby wakes first, he will pull the fawn's ears. We call them the twins."

One day in a very lonely thicket of the plantation I came upon a very frolicksome group of wild babies. Four little foxes, four little fluffy balls of fur and young rascality, were having a pillow fight right in the front parlor! Their parents were, of course, away from home; and, like any other enterprising youngsters, they were taking advantage of relaxed household discipline.

Bowered in a sweet-smelling wilderness were they—beside the upheaved roots of a hurricane-thrown tree. All around, as far as the eye could see, were thickets of sweet myrtle, scrub pine, gallberries, hollies, sparkleberries. Even the sunshine looked shy as it stole into this remote sanctuary. The woods were silent save for subdued birdsongs.

In a pine tree about thirty feet from the den, I had an old board set across two low limbs; and from the seat thus made I could watch the antics of the wild family, the home of which I had, by a happy chance, discovered some weeks earlier.

While crossing a broomsedge field I had started the old female fox, had watched the direction she took, had followed her with a hound on a leash, and so had come upon the den, far back under the upturned roots of the prostrate pine. The little cubs must have been born a few days after that time; and I thought it would be possible to watch them playing in the balmy spring sunshine before their wilderness home.

On this particular morning the world was emerging roseate from its bath of dew. In the warm air happy mated

Fawn—Hiding in the Mountain Laurel.

birds were warbling like aerial rivulets. A scented sea wind made the tall yellow pines murmur and wave. There were many sights and sounds to distract me; but I had come into this wildwood to watch these foxes. And they were worthy of my attention.

I climbed into my pine before sunrise, and then there was no stirring at the den. But with the sunlight's flaring through the dew-tasseled woodland, I saw an elfin face appear at the aperture between two pine roots. There is, I think, no creature that has so charming and mischievous a face as a little fox. The face of a fawn is almost pathetic in its delicate beauty; that of a little raccoon is almost laughable in its ancient urchin wisdom. But a little fox radiates a childish joy that is all the more attractive because it has the elfin grace that belongs to things essentially wild. These children of the wastelands, especially those that are hunted much, have a certain fairy lure wholly denied to barnyard folk.

Around the mouth of the den were some old chicken wings, some polished bones, and some other telltale relics—these being in a tiny arena that the young foxes evidently used as a play yard. Out into this open space one of the little mischief-makers stole. He eyed the world with a child's spacious, glad acceptance; yet he seemed delicately set on springs—ready to dart to safety in a second.

Three others now joined him swiftly and noiselessly. One grabbed up a chicken wing and shook it in his mouth teasingly, as if saying, "You can't get this away from me!" The three others took the dare, and in a moment chicken feathers, tiny fur-tipped ears, sprawling feet, ruffled tawny little backs, lovely fluffy tails—all were mingled in a wild mêlée—and from the feathers flying it reminded me of the kind of pillow fights my brothers and I used to have when choice opportunity offered.

They snarled, they buffeted one another at random, they forgot all about "sides" and went after it pell-mell. Now and then, for a flashing instant or two, one would rear himself up on his hind legs, put up his "dukes," and bid defiance to his brothers and to the world in general.

The kids were simply having a royally good time—when suddenly they froze, each in the posture in which his fear had caught him. Then they made a wild, incontinent break for the hole of the den. Such scampering! Of course all of them "made" the aperture at the same moment. Worse confusion! And for me a glimmering vision of wildly waving hind legs and foreshortened, frantically bobbing tails. But the babies manfully managed the mighty squeeze. No sooner had they entered the den than they faced about, and there were four appealing little faces wedged at the mouth, unwilling to miss a single glimpse of this fascinating, thrilling experience called Life!

The cause of all their trouble was that mother had come home; and her foraging had evidently been in vain. Plainly, she was in a disappointed mood, and the babies realized that they must be on their good behavior.

The fortunate observer of such a scene of the intimate family life of wildwood children experiences perhaps the keenest emotion that can come to the lover of nature: he feels a momentary identity with the universe. No longer is he a stranger on a solitary pilgrimage, but is related to all life; the wild creatures are his brothers and sisters, and the flowering wilderness his home.

As I lived near the delta of the Santee River, which is subject to great floods, at the times of these inundations there came to my plantation shores many refugees from the freshet-tide: deer, wild turkeys, swamp rabbits, king rails, and great wild boars from the monstrous swamp country to the northward of us. Perhaps rarely has the observer of wild life such an opportunity as comes to him when such waters are rampant. Wandering along the mainland shore, he encounters whole concourses of these creatures, strangely tame because out of their natural haunts.

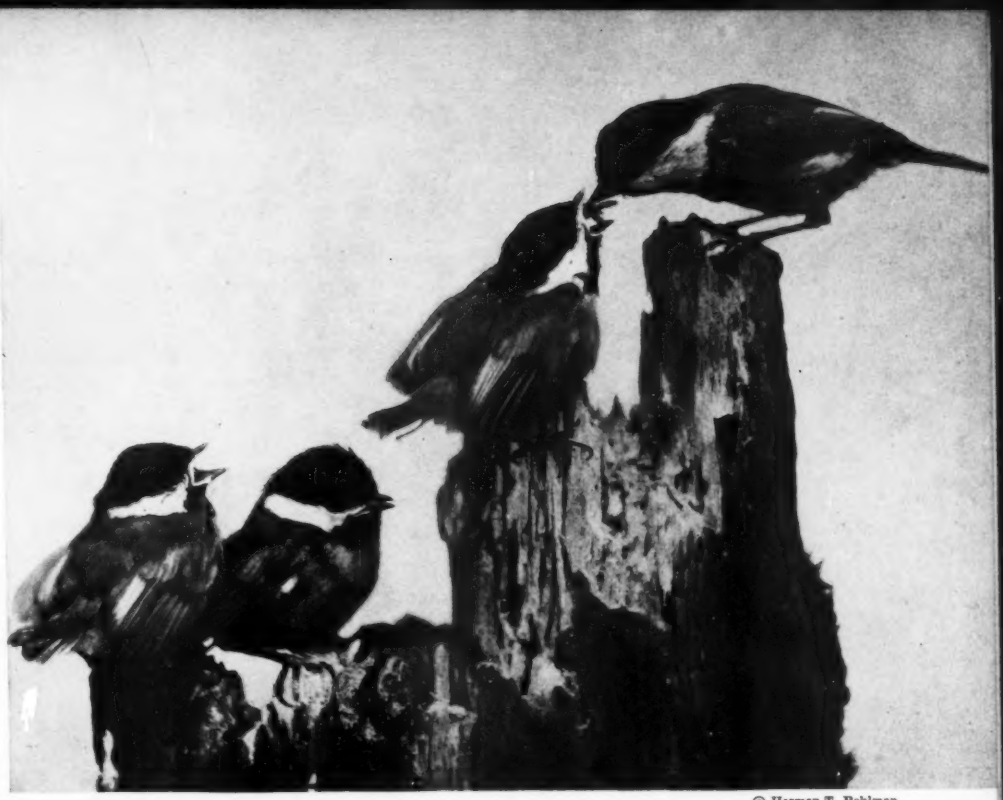
One day I came upon a baby raccoon sitting forlornly on a drifted log lodged against the bank. As it was raining at the time, I was wearing a dilapidated old coat—the despair of my wife! It was an ancient shooting-jacket, with voluminous side-pockets. Lifting the stranded infant from his perilous position, I put him in the right-hand pocket, where he promptly snuggled down and went to sleep.

Until I turned that raccoon loose several months later, when he was full grown and entirely able to take care of himself, he had a passionate attachment for that coat and for that particular pocket! Ordinarily he was content to stay in his box; but the minute I appeared in that old coat, he would begin to whine and beg. He would climb up my leg, pausing at my trouser-pocket to search with his delicate hand deep in its depths, for there he had once discovered some peanuts. Then he would curl up contentedly in the coat-pocket,

© Downey & Rutter

while I walked miles over the plantation fields and woods. Sometimes he would leave the pocket, make his way up my arm, and then for a long time perch on my shoulder, from that vantage-point enjoying the scenery! Of all the pets I ever had, this baby raccoon was the wisest. Even as an infant he had the look of a philosopher; and his sagacity of behavior never belied his sagacity of mien—which is a thing that cannot always be said about human beings.

In all wild life, those traits which characterize mature creatures are early manifest in the young. For examples, my attempts to make pets of young alligators, wildcats, and eagles never got very far. These predators have an innate fierceness in their natures that apparently can rarely be "gentled" out of them. Even when they are born in captivity, their primal tendencies remain the same.



© Herman T. Bohlman

The best way to watch babes in the woods is not to walk along, however self-effacingly, but to sit still. The silent and motionless observer is the one who really sees things. In the reeds, in the bushes, in the grasses there are eyes that glow and glisten; in tiny retreats amid drifted leaves or on the fairy isles of tussocks amid morasses, there are little noses all a-quiver over the faintest scent in the air; little feet are poised for fleeting escape. All are wary watchers, even the youngest baby. Sometimes they lie gay amid gay flowers; sometimes green in a green bush, or tawny in dead grass. They are swift in flight, but as swift not to move. Seldom will you be aware of them unless you imitate some natural object. Become for awhile like a stump or a tree or a log, and the pert fairies and the dapper elves will troop from their hiding.

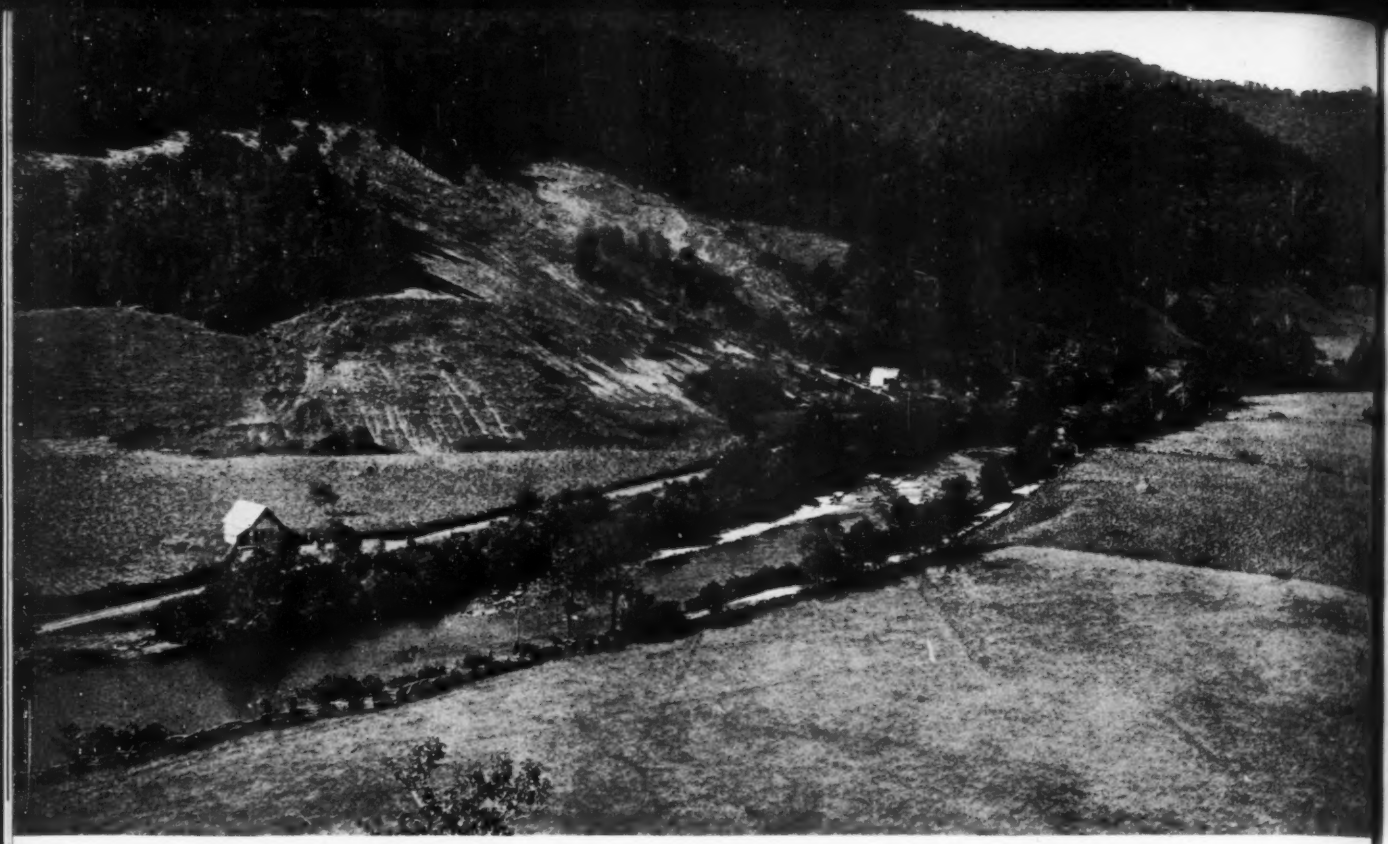
One day in June, sitting half-hidden in the bluegrass of an old apple-orchard, I heard a faint buzzing over my head, which I took at first to be the humming of bees. But certain sharp ecstatic notes, almost like those of an insect, told me I was wrong. On a small limb I saw the tiniest of all birds' nests—that of a ruby-throated hummingbird. Woven of down and lichens, it was securely bound to the limb by delicate filaments of milkweed. Over it hovered the tiny mother, feeding her four young. Their size can be imagined when we remember that they came out of eggs no larger than navy beans. With honey-dew sucked from the showy flowers of a nearby trumpet-creeper, the mother was giving her children their breakfast. She fed them from her bill, sometimes while still on the wing, sometimes while perched airily on the rim of the nest. In this domestic duty the gaudy male took a little part; but by actual count, the mother made six trips to the trumpet-creeper to his one. In the natural world the care and the rearing of the young rest almost entirely on the mother. Certainly in both wild and in human life motherhood has a certain cosmic function which enables it to manifest a superior valor, devotion, and persistence of purpose to that possible in fatherhood. As a rule, threaten a child of any kind of mother, and you are in for a life-and-death battle. This is as it should be.

Sometimes babies are born in the woods out of their natural element, and have to be carried to it. I am thinking of the wood-duck, which invariably nests in a tree, not infrequently at some distance from the water. I have seen a mother wood-duck, nested over water, put six or seven of her downy babies on her back (talking to them sweetly and reassuringly all the while) and sail gently down to the surface of a lagoon, where she sank herself in the water, permitting her little ones to float off her back. And I have seen a wood-duck mother carry her young in her bill (one at a time), flying to a pond through more than a mile of forest.

In all my observation of babes in the woods I have always marked the rapt attention that these children pay to their mothers; their remembering of parental injunctions; their elfin wisdom to understand and to obey. They seem to be taught, almost as soon as they enter the world, certain laws and principles; and from their behavior we have a right to conclude that they realize (as we should) that there can be no safety and no happiness outside the law. In nature as in human existence, only they are free, sane, and truly joyous who live according to those laws which are like God's hand on the controls of the world.

NATION-WIDE RADIO BROADCAST FOR ANNUAL MEETING

Through the facilities of the National Broadcasting Company, a part of the program of the Annual Meeting of The American Forestry Association will be broadcast over a nation-wide hook-up. If it is impossible for you to attend, tune in at 12:30 P. M., Eastern Standard Time, on Friday, October 19. The speakers will be Henry Solon Graves, President of The American Forestry Association; F. A. Silcox, Chief, United States Forest Service; Major General George Van Horn Moseley, United States Army; and Dr. Arthur E. Morgan, Chairman, Tennessee Valley Authority. A special feature of the broadcast will be a program arranged by C.C.C. enrolled members.



This was good land—cleared and farmed for a few years and then abandoned. Much of such high-grade land had to be given up because it gullied badly, or because of the extreme poverty of the subsoil exposed by the gradual washing of the topsoil, unfitting it for agriculture. Many of these ruinously washed areas occur on gentle slopes, though the majority occupy the steeper slopes.

THE STATE OF THE SOIL

Land Impoverishment in the Tennessee Valley Calls for Control of Erosion and A New Concept of Regional Land Use

By H. H. BENNETT
Director, Soil Erosion Service

LAND-USE practices in the Tennessee Valley are acutely in need of improvement. Too many land users are indiscriminately farming the highly diverse soils, to all kinds of crops, with but little effort to control the impoverishing effects of the erosion taking place with every rain heavy enough to cause water to run downhill. That this has been the practice for many years is shown by the presence of second-growth pine, in many instances twenty-five to fifty years old, on formerly cultivated areas of both moderate and steep slope. Many of these naturally reforested areas still show the scars of gullying and deep sheet washing that resulted from unwise land usage preceding abandonment.

Over the greater part of the cultivated area, the prevailing methods of land utilization are becoming worse instead of better, not only with respect to soil selection, but in the matter of clearing and farming steep land and failure to provide adequate protection against erosion. Here and there are exceptional farms on which the erosive slopes are largely seeded to grass or lespedeza or are farmed according to good cropping systems. To a large degree the flat and gently sloping lands only are used for the clean-tilled crops by these more progressive operators. The steeper slopes are left in timber, sown to grass or utilized for pasturing the volunteer wild grasses and other plants. By way of contrast to prevailing conditions, these outstanding examples of correct land usage unmistakably show what can and should be done.

The early settlers generally cleared and cultivated first the more productive valley lands, showing preference for the limestone soils, which in their virgin condition were among the most productive upland soils of eastern America. The better classes of these limestone lands were largely under cultivation fifty years ago, as were most of the broad and narrow strips of rich stream bottom. From this initial step, land usage in the limestone valleys and uplands portion of the Tennessee watershed extended to the less productive shale-derived soils and the thinner gravelly limestone lands. First the valley areas were used, and then the slopes of the high ridges threading the southern extension of the Great Appalachian Valley. Gradually, the fields were carried higher and higher up the slopes to declivities exceeding seventy per cent in some instances.

While a considerable part of the steeper land of the limestone-ridge section is still in forest, the process of

clearing is going steadily forward; indeed, it is speeding up in some locations, as in those sections where the growing of Burley tobacco has recently become an important industry. A considerable area, on the other hand, has never been cleared, and probably never will be, because of its extremely rough topography or excessive stoniness. Many fields, nevertheless, approach the very limits of arability. For example, in some localities numerous patches of limestone soil are being cultivated between thick outcroppings of rock, as on the lower western slope of Richland Knobs, northwest of Knoxville, where in some cases, the land is so stony that less than one-fourth of it can be plowed. Also, patches of ground on isolated shelving positions have been picked out from the roughest ridge and mountain sections by a considerable number of small farmers and planted to crops, often under extremely unfavorable conditions.

There are numerous deeply washed abandoned areas, which were formerly cultivated and consisted of high-grade farm land. These were given up either because of their rough gullied character or because of the extreme poverty of the subsoil exposed by the gradual washing off of the topsoil. A considerable part of these ruinously washed areas occurs on gentle slopes; but the greater part occupies the steeper slopes, some of which washed to a worthless condition within a few years following removal of the timber. These severely eroded lands are being left alone for the most part, although an occasional farmer is undertaking to reclaim portions of them by planting locust trees and such soil-saving crops as grass and lespedeza.

Many farmers continue to clear land which they expect to wash to a condition of depletion within three to ten or fifteen years. Freshly plowed fields were seen in March last year, along the westerly slopes of Clinch Mountain, where the declivity measured in excess of seventy per cent, and the land was of high susceptibility to erosion. What happens to such fields is unmistakably revealed in neighboring abandoned fields riddled with gullies or stripped of the productive surface soil down to subsoil so poor that even such robust plants as broomsedge and pine often make exceedingly slow or no progress.

Every year the area thrown out of cultivation is increased despite the fact that many fields are annually recleared of the second-growth pine, persimmon and sassafras that sprang up following previous cultivation and abandonment. Generally, where the land was turned out because of excessive washing, the crops produced in this second cycle of utilization are distressingly meagre. Here, as elsewhere throughout much of the nation, severely eroded land does not recuperate rapidly under natural conditions, or under any other condition for that matter. The process of soil restoral is exceedingly slow. Centuries are required for nature to build even a single inch of the mellow humus-charged surface layer found in virgin forests and grasslands.

On the light-colored, cherty ridge soils of the Frederick and Clarksville gravelly loam types, slopes no steeper than ten or twelve per cent sometimes lose the entire surface layer by washing in from three to ten years where cultivated continuously to corn or other clean-tilled crops. The same loss takes place in about fifteen to twenty-five years where the less efficient short rotations are practiced, with the clean-tilled crops occu-

Formerly high-grade Tennessee Valley land ruined by erosion and abandoned. Some of the rich bottom land at the foot of the slope has been damaged by poor subsoil washed out of the gullies in the background.

On this site north of Lenoir City, Tennessee, decatur clay loam has been ruined by erosion. The exposed subsoil, following the removal of about three to four feet of top soil, is so poor that not even weeds grow over most of the area.

A stabilized farm on the watershed of the South Tyger River project in the Piedmont of South Carolina illustrates practicable methods of land cropping which the author says must be applied throughout the Tennessee Valley. Here the Soil Erosion Service is protecting an entire watershed of 125,000 acres with a coordinated program of correct land use. Observe that the steeper slopes are protected with trees, that cultivation is performed strictly on the contours of the slopes and that erosion is controlled by the new system of strip cropping. During the coming winter seventy-five per cent of the cultivated part of this farm (the most erosive part) will be covered with erosion-resistant crops.

pying the land the greater part of the time. Following abandonment, weeds, broomsedge, poverty grass, and to some extent other grasses, immediately come in on the soils of the cherty limestone group, except where the depth of erosion has extended into the deeper unproductive subsoil. Revegetation is always much slower under the latter condition. Sassafras, persimmon and blackberry also spread over the denuded areas within a very short time, and old-field pines usually appear within a few years. Along with or after the pines, oaks spring up scatteringly in many of the old fields. Such growths always have a markedly restraining effect on erosion wherever established in dense stands, usually arresting it if not burned over too frequently, especially on those areas where gullying does not exceed two feet in depth.

On shale-derived soil (that derived from the non-limey shales), however, little or no vegetation as a rule reclaims the gullies until pine trees have become sufficiently large and dense between the gullies to contribute a humus covering to the excessively poor, raw subsoil of the faces and bottoms of the gulches. In this manner vegetation creeps down into the ravines, and they heal over after long periods, depending on the character of the exposed subsoil; but the gullies remain, some of them continuing to cut deeper, for undetermined periods.

This reservoir on Pacolet River, at Converse, South Carolina, filled to the top of the expensive stone dam with silt, emphasizes the need of controlling erosion if water storage investments are to be protected. Supplemental storage is being attempted here by the erection of a wooden flash board on top of the stone dam. Another reservoir six miles distant has been similarly filled. Cultivation of the watersheds and lack of erosion protection are held responsible.

Erosion is by no means confined to the steeper slopes of the Tennessee Valley region. It proceeds more rapidly under such conditions, as a matter of course, but it is a troublesome problem on practically all the sloping lands of the entire watershed, whether the gradient is mild or excessive. Particularly is this true in the valley-ridge section of the basin.

Every sloping field within the Valley of East Tennessee and its southwesterly projection along the Tennessee River is subject to wasteful washing when used too much for the clean-cultivated crops. Much silty soil of shale origin has been damaged on slopes no steeper than two per cent. Numerous (*Continuing on page* 502)

EDITORIAL

The Message of The Oaks

IN these times of world unrest and concomitant strivings to change the existing order, one often wonders what the silent sages of ancient woods who have witnessed humanity's struggle through the centuries would say if they could speak. M. Jagerschmidt, an eminent forester of France, has interpreted this message from the veteran oaks of a forest that has known two centuries of skillful management.

"If the old oaks of the *Forêt de Blois*, wrapped in silence and meditation, could speak to us, this is what they would say:

" 'Respect the past. Respect traditions. If you change in some part the methods followed by your predecessors, do not destroy anything good, conserve with care the heritage which the fathers have left you. Strive to transmit this heritage to your successors, not merely intact, but more beautiful and more rich. Let each one help his fellows. If we have trunks that are both straight and tall it is because we have grown as comrades in a group, because we have each profited by the reaching out of all toward the sunlight.

" 'Practice the spirit of moderation, order, and balance. This spirit animated the foresters who have given us their care through two centuries—it is the old French spirit.

" 'Practice the spirit of discernment and simplicity, of intellectual humility. You are but a link in the chain connecting the past with the future. Look far into the past, far into the future, and you will better support the trials of the present.

" 'Work for that future and do not worry about the outcome. Let God be your guide!' "

The Tennessee Valley

DR. ARTHUR E. MORGAN, Chairman of the Tennessee Valley Authority, in his article in this issue, "More Than Building A Dam," gives a very human and intimate picture of the objectives underlying the New Deal's major exploitation in the field of social planning. One of the prime purposes of the Tennessee Valley Authority, Dr. Morgan states, is to try to create a new economy out of the resources and the virile population of the Valley. "I do not call that regimentation; the people here do not call it that," he declares. "They want an opportunity; they do not have to be driven to do these things; they are eager to do them. What we want to do is to furnish opportunity without compulsion."

The undertaking, Dr. Morgan explains, is an experiment in rebuilding the economy of a region so that "ownership and workmanship shall reside in the community" and prosperity shall have its roots in the native soils. "We are on an uncharted sea to some extent," he admits. "We are lying awake nights, thinking how we can take the remnants of resources here, the fine population and cheap power and work out an industrial organization that the people will be producing wealth, getting the results of their own labor and using that to raise themselves to a higher level socially and economically."

To opponents of the project, Dr. Morgan's frank and simple statement of purpose must prove disarming. In methods of accomplishment, appraisal of values and integration of resource development there is wide latitude for criticism and differences of opinion, but the political philosophy of the project as expounded by its Chairman seems not open to fairminded dispute. The Tennessee Valley is only one of many great drainage areas of the United States wherein individualistic exploitation of resources has helped to dry up social and economic opportunities and to bring American life to a crossroads. The project in its larger significance, therefore, represents an attack on conditions quite general throughout the country that are severing the very roots of permanent national welfare.

The experiment will undoubtedly prove costly—more costly than subsequent projects of similar kind. Initial undertakings launched under the stress of human emergency usually are, particularly when as in this case people have been blind or complacent to economic causes and are unprepared to meet the shocks of massed economic forces. Without benefit of guiding experience or time for adequate study or planning, the Authority has had to embark upon an undertaking of almost empire dimensions. If the objectives envisioned by its Chairman are achieved, the project will have charted the course and laid the cornerstone for the permanent rehabilitation of other regions. Whatever the cost, that will be a legacy of incalculable worth to present and future generations.

IN THE TENNESSEE
WARS AGAINST THE

Above — A seed planting crew at Camp No. 8, preparing the sinews of war — little trees to furnish stock for this enormous enterprise and eventually to close the yawning gashes in the soil made by the enemy, erosion.

Below — Building defense works of diversion ditches and rock dams on heavily washed slopes.

VALLEY THE C.C.C. EROSION ENEMY

Above —Preparedness! Brush matting on clay and shale slope preparing the ground for seeding to grass and tree planting to hold the soil.

Below—Civilian Conservation Corps boys from Camp 25 in the Tennessee Valley stop enemy inroads by building stone and log dams in a gully.

Photograph by Ernest L. Crandall

"Mountain, Valley and Stream"

October, at Rutland, in the Vermont hills.

★

Invitation —

Will you come with me to some far hill
And find a hidden trysting place?
For now the Summer's had her will,
But left for us her blue
Clasped in the gentian's fond embrace.
I'll show you larches, dreaming in the sun,
From fairy gold their dainty laces spun;
A shadowed pool whose mirror floats
A fleet of yellow, elfin boats
That aged beeches, from their ways
Launch gayly thru the Autumn days.
We'll watch the smoldering sun thru twilight's haze,
Kindle the bitter-sweet into a fiercer blaze;
And then, beneath the stars, in silence trod
The homing path,—and leave our hill with God.

—JOHN PHELPS.

EXHIBITED—National Competition Conducted by
The American Forestry Association
for
Beautiful Photographs of Trees in America

MOUNTAIN ARIEL--

A STORY OF GATHERING WILD HONEY IN THE SOUTHERN MOUNTAINS

By MARY CARTER ROBERTS

I WAS spending the summer with my father at our cottage in the Southern mountains and I went one day with him and Mac into what might be called a "beechen shade" to see an oil well pulled. When that rather incomprehensible and complicated operation was at an end, Mac said, jerking his thumb upward in a casual manner:

"There's bees up yander."

"Yes," replied my father in tones of extreme bitterness, "so I noticed some time ago. And I suppose, before long, you will be coming to me to get leave to cut my tree down, too. All for a tin cup full of old black honey."

My father is on the rare footing of equality with the mountaineers of his neighborhood. Mac smiled appreciatively. He was a slight young man, dreamy, modest of demeanor and downcast of eye; and so are most mountaineers.

"There hain't nobody ben here so fur but me an' ol' Bill Coe," he informed my father. "You kin see fer yourse'f. That-there's my mark an' this-here one's his'n."

He indicated two carvings in a pale beechen trunk as he spoke. One was an X enclosed by a circle. The other was a cross.

"I jist happened-like to notice this-here was a bee tree one day when I was a-huntin' my cow. Heered em a-buzzin', an' I looked up an' there they was. I 'lowed I'd found her first, but shore 'nough, when I come closter here was ol' Bill's mark on her. He shore is a bee hunter. I jist put my mark on anyway. I 'lowed mebbe he'd trade her fer somethin'."

My father, who was in a pleasant humor, continued to make bitter remarks about loafers and no-accounts who would cut a man's timber before his very eyes, all for the sake of an infinitesimal quantity of inedible wild honey. Mac leaned against a tree and listened, continuing to wear his appreciative smile. At last he said:

"I wasn't a-'lowin' to cut her this year, nohow. D' you remember that-there one we cut over on Nettle Run and tuk out nigh on to two gallon? You was there all right. I recollect it like 'twas yesterday."

My father was silent. Turning to me, Mac said with great candor:

"He don't never miss no bee tree cuttin' if he kin he'p it. He's jist a-lettin' on some today."

This is the mountain sense of humor, as I found it. It has its depths in a species of subtle psychic horseplay, deriving its point from a quiet removal, as it were, of the chair from beneath the mental sitter.

Meanwhile, I rather gathered, there was a hollow trunk full of the wild bee's store somewhere close at hand. I looked eagerly up into the sun-flecked foliage of the marked tree but saw no golden train coming in and going out. I listened but heard no buzzing. I was puzzled. Mac and my father, coming to my assistance, endeavored to show me the direction. They stood one on either side of me and pointed helpfully.

"Right up there," said my father, over and over, "Right there—see? Right by that little open space."

"Right alongside that-there bunch o' leaves," was Mac's formula.

At last I made out, perhaps seventy-five feet up, what I thought at first was a swarm of flies or mosquitoes dancing in the sunlight. How anyone had ever detected them as bees I was unable to understand. There seemed to be no direction

to their movement, no line coming in laden while another emerged, no heavy, steady, bee-like quality to their flight—nothing, in fact, but the occasional immaterial glint of sunlight on insect wings, and that limited to a patch of sky showing through the leaves in area no bigger than a pair of hands—seventy-five feet up in the air. How a man intent on tracking a strayed cow had ever casually glimpsed and identified those tiny golden flecks was more than I could understand and I said so. Mac at once disclaimed any skill in the matter. He was not much of a bee man, he said. He waved at the encircled X on the bee tree trunk.

"Ol' Bill Coe, he shore kin find 'em though. They hain't ary man in this-here county kin beat him a-trackin' bees."

I confess that the idea of "tracking" a bee interested me. Next to looking for footprints in the water, it struck me as being as intangible a pursuit as one might find in a day's traveling. I suggested later that afternoon to my father that we interview Mr. Coe on the subject of his art. But my father said no. Mr. Coe, he informed me, did these things unconsciously. He would not know himself how it was accomplished. Besides, he would be horribly embarrassed at being questioned on such an intimate subject—particularly by a woman. I wanted to know why the sex bias. My father sighed.

"If it were a man," he elucidated, "he could walk away and leave him. But he thinks he has to be polite to a lady."

However, I persisted in my interest in this shy bee hunter, and, accordingly, a few days later, my father informed me that he had arranged a bee tree cutting for my benefit. Moreover, he said, Mr. Coe was to be in charge. I was all anticipation.

When the day came my father and I started out together early in the afternoon to meet, as I supposed, Mr. Coe at the tree. My father, to be sure, intimated that Mr. Coe would bring certain members of his family along to help him, but I scarcely noticed that information for I was curious only about the bee hunter himself and his intangible profession. Judge my surprise then when, after an hour's walk along a trail that was like a tunnel through the greenery, we arrived at the tree and found a dozen people wáiting for us. In the mountains a dozen is more than a crowd. It is a "gathering."

"Heavens," I said, "the whole county has turned out."

"No," replied my father absently, "oh no! That's just a few of Bill's family."

They were all in festival mood evidently, a mood which, in the mountain adult is expressed by an exchange of sardonic witticisms, usually of a most personal nature, and in mountain youths by an indulgence in loud whoops. As both adults and youths were present in some numbers each pastime was in full swing. The elders sat or leaned, in attitudes of perfect repose, suggestive of a complete philosophy. The lads crashed in and out of the undergrowth. As I approached, one, about eight years old, planted himself in my path and thrust out a spray of wild ageratum.

"That-there's fer ye," he announced, and the other youngsters whooped in concert. I learned later that my fondness for wild flowers was regarded with universal amazement by my neighbors thereabouts.

A stalwart handsome woman arose from a log and proffered me her hand. My father hastened to introduce us. She was Mr. Coe's spouse and the mother of that congregation. She looked to be about forty. Her dark hair was bobbed and her skirt fell to the knee of an exceedingly shapely, hard, bare leg. On her feet were sandals.

"That-there's only Charles," she said boredly of the giver of gifts. "Don't ye mind what he does, mom." She picked up a stone and hurled it after her son, who dodged expertly.

But for two bare-legged little girls, aged about six and obviously twins, there was no other female than Mrs. Coe about. Four or five of the sons were old enough to feel that the toga of manhood had fallen on them. They regarded me politely but aloofly. Men in the mountains are shyer than boys. It is not so much that they are uncomfortably conscious of women as it is that they are intensely conscious of themselves as men, and so are alarmed and made uneasy by women in any but very definite and conventional relations—mothers, wives, old maids, girls "a-courtin'," good women and bad women. Toward these they know, and strictly hold, the proper attitudes. But any female not so classifiable is an affront, in some mysterious way, to their masculinity. I was, and I knew it—a strange creature who wandered about in the

woods alone, went swimming and canoeing alone and took enthusiastic notice of common flowers and birds wholly unworthy of notice, smoked cigarettes instead of dipping snuff, was past twenty-five and still somehow not exactly an old maid either. Their knowledge of my family prevented me from being an object of real suspicion, but they felt that I was uncanny even at that. Their courtesy was magnificent.

Meanwhile Mr. Coe himself had not arrived. Mrs. Coe spat snuff and conversed with formal politeness. The little girls drew gigglingly near, as did the other children up to about the age of sixteen. I inquired about the tree.

"Bill, he's had his eye on this-here one fer nigh on to three years," Mrs. Coe informed me. "That-there's his mark." I discerned the X and circle. "They's a couple more on hit but Bill's his is first. You kin see yourse'f. His'n is oldest."

"That-there V is Bob Manifee's," remarked one of the boys.

"No 't haint. That-there V is Wes Whitecotton's. Bob Manifee he always makes a star, like. Wes Whitecotton he always makes a V. That-there V is his'n. Bob Manifee he makes stars. Wes Whitecotton makes V's."

The argument between the two boys grew assertive and then one of the young men said, "Shet up, kids," and silence fell. The boys played mumble-peg. At last someone said, "Hyere comes Pap," and I looked up to see the bee hunter himself advancing along the trail.

He was a tall, extremely thin man with dark Indian-like locks falling over his brow. His eyes were a singular violet blue, long-lashed and amazingly distant and calm. The same calm pervaded all his movements, save that he used a sort of slow finicking niceness in picking his way about. This was Ariel.

"Hello, Bill," said my father.

"Howdy," said Mr. Coe. He looked at me and then back at my father. "That-there one's Mary," he stated. "I recollect her when she was borned." He went on speaking to my father. "I recollect all yourn," he said. "This-here one's Mary. I know."

Then he spat tobacco juice—politely, to one side, first covering his mouth with his hand—and addressed me directly.

"Howdy, Mary," he said.

He was undeniably impressive.

"Well," exclaimed my father, "let's get this tree down! I see you've all brought buckets. There's not going to be a tincup full in that whole limb. But let's get at it—let's get started. Come on."

Mr. Coe moistened his palms and picked up his ax.

"Three gallon in this-here one," he said. He turned to me. "Your pap he hain't never missed a bee tree cuttin' in ten year, Mary," he said. "He's jist a-lettin' on some today."

If this was true of my father I could well understand it. There was something primitive and exhilarating about the preparations that we now began, something vastly more tangible than that throwback sensation one gets from building a fire in the open. This was the actual capture of food which we were re-enacting. Wild honey! It had a poignant and wistful sound. I went close to the tree and stared upward, but again I could see no bees. The men were busily discussing which way they ought to "fall her" and at first gave me no assistance. Finally Mr. Coe himself came to me and pointed and again I made out, high overhead, the brief tiny flicker of insect wings, passing across a little island of sky between oceans of leaves that blotted out even that brief evidence the second that it came in line of vision with them.

"I don't see how you ever find them," I remarked.

"These-here air hard to see," conceded Mr. Coe. "These-here air them yaller Eyetalian bees. The little black Amurrican bees, they's another kind. They're plumb easy to track though."

He went on to tell me that Italian bees had been imported—"brung on"—because they were a better variety for domestication than the native wild black bees, and that escaped swarms had gone into the woods and were now common. They were harder to trail because they were harder to see, he said. The black bees were easy. I looked at his calm blue eyes and marvelled.

How, I inquired, did one track a bee anyway? Mr. Coe looked at me as from a great distance.

"I kin tell ye," he said at last, "but I can't make ye onderstand."

No, I told him, I was sure of that. He seemed to feel at ease on hearing my admission, and gave me then and there all the information that I have about his method. The bees, he said, got thirsty. (Imagine the thirst pangs of a bee!) They came then to the run to drink and it was there that he, lying in wait, took up the trail. True to their reputation for industry, they do not come to refresh themselves until they gathered their load of honey. So, rising from the stream, they invariably start toward the nest. They go perfectly straight—"Hit's a bee line they make," Mr. Coe told me. It seemed very simple to him, after that. All he had to do was to follow. If he lost the track of one bee another would pass soon; he would only have to wait, for they all watered at the same spot. I asked how high they flew. "Up in the timber," he told me. I asked then how far did he usually have to trail them from the run? "Never no more than three miles," he said. For, he added, the watering places were not often farther apart than that.

While we were talking our party was joined by still another member of the family, the daughter, Elma. She had a story. I had heard it. She was blue-eyed, like her father, pallid of skin and beautiful. I do not think that I have ever seen a more beautiful girl. She wore a pale blue cotton dress and vivid green sandals. She was carrying a baby on her shoulder and that was her story. The baby was hers, but she was not married.

This is shame in the mountains—shame, but not disgrace. It is shame in the same way that it is shame for a man to be caught stealing; everyone knows that stealing is wrong, but nobody knows when he may be driven to it himself. So there is extenuation for everything, and the unmarried mother is merely looked at, a little curiously. No one would dream of affronting her. Anyone would help her.

The bee hunter's family, however, showed me that they wondered what I would think. They were not proud—that is hardly the way to express the mountaineer's sensitiveness. They were pride, rather. Their pride was themselves. They would bear no scrutiny from strangers. They said nothing; there was just a little spiritual drawing together, a tightening of the atmosphere. That was all. Elma herself seemed wholly aloof. She nodded to me without speech. Then her mother took the matter into her own hands. She reached for the baby, took it and, bouncing it up and down, said to me proudly:

"This-here one's my youngest. Hit's a girl, jist ten months old. Don't hit favor hit's pappy though?" And she nodded toward her husband definitely. With that the air relaxed.

Bill began cutting the tree. It was a white oak, tall and spindling and standing on a steep slope. It had been decided to "fall" it downward. The bees were high up in it, coming in and out of a knot hole not much bigger than one's fist, their store evidently located in the trunk. Bill swung his ax with a wide virtuosity and a strength amazing in so frail-looking a man. His strapping sons eyed him complacently. Children are always children in the hills. Some of those sons were married themselves, but unless their father had told them to cut they would have considered it presumption to offer to.

Very soon the white oak stood with a precariously deep notch in its upper side. Bill put down his ax and looked around.

"Bin," he said.

Ben, one of his older boys, promptly stood up.

"Better get ready," said Bill. "Me an' Jawn air a-goin' to saw her now."

Jawn, acting on the hint, came forward with a shining two-handled saw that flopped across his hand like the body of a newly caught fish. Ben set to "getting ready" as his father had directed. This preparation consisted in draping his hat with gauze, which he then started to pin down to his chest. He stopped though, almost immediately, looking foolish. He had forgotten to bring pins. Mrs. Coe rummaged in her garments.

"Ye never did have no sense," she told him candidly.

She produced several but we were still one shy. I proffered a hair pin. Ben took it gravely, to the accompaniment of much grinning from his young brothers.

"I hain't never wore one o' these-here afore," he announced at last and the pent-up merriment burst out into giggles.

Meanwhile Jawn and his father sawed. I watched them with fascination. It seemed to me that the trunk must reel at any minute, but it did not—and luckily, too, for Jawn remained standing directly in its potential course. I heard my father growl and saw that he was irritated about something. Later he told me that Jawn had been imposing on Bill, not pulling his share and obliging his father to do most of the work.

I was not aware of this then, but I noticed Jawn anyway. He was the bee hunter's oldest son, about twenty-seven or eight, well over six feet in height and built with a strong suppleness. He had his mother's hard handsomeness but his father's amazing eyes—their expression tempered, however, by a look of complacence and bold stealth. My father had already informed me that he was a bootlegger of the new times—one who did not age his liquor properly—and also a fairly notorious sneak thief, having a predilection for the henroosts and automobile tires of his neighbors. I could not help thinking how fine a career he might have made for himself in another society, with his splendid looks and natural tendencies. Nor was he unintelligent, either.

At last the tree moved. I did not catch its first tremor, but I heard Bill shout and saw Jawn scramble out of the way. Then the trunk visibly reeled, and toppled, and finally fell, widely out over the yawning slope, stopping our breath and carrying our hearts down with it. Surely, nobody can ever speak or move while a tree is falling! Only when this one had crashed did we let out a cry, half of mourning, half of triumph. Quickly the voices swelled into mountain whoops, and preparations for robbing the swarm went to fever heat.

With screams of delight the youngsters went streaking through the undergrowth to within a safe distance of the hoard, squealing back the word to their elders.

"Ooh, they jist a-rarin'! Gee whiz, look at 'em come! They'll git ye! Hurry up, fellers! Come on, whip 'em with smoke!"

The "whipping with smoke" seemed to be the next step. Ben produced a bundle of old rags tied into a torch-like shape. These he lit and then, carrying the smoking mass, he descended toward the fallen trunk.

Bill himself also donned a veil and gloves, lit a torch and followed. He and Ben, it seemed, were the only ones considered safe to tackle the newly angered bees. Just before he started down the slope he spoke softly to me and pointed upward.

"Lookee, Mary," he said.

I looked and saw, at the spot where the entrance to the hoard had been, buzzing in vacancy and—the supernal Queen Bee only knows what despair—an ever-thickening swarm.

"That's where they'll go to," said Bill. "They'll jist buzz away up there ontel—" he (*Continuing on page* 496)

NATIONAL FORESTS IN THE TENNESSEE BASIN

By

JOSEPH C. KIRCHER

Regional Forester, United States Forest Service

A highly organized and efficient fire protection system is being built into the National Forests of the Tennessee Basin. This is the Camp Creek lookout tower on Bald Mountain, in the Pisgah Forest.

IN MEDICAL science, emphasis in the olden days was largely placed on cure of disease. Modern thought, however, has turned to prevention as of prime importance. In other sciences, too, prevention has become of more and more importance in our thinking. It is unfortunate that this principle of "a stitch in time saves nine" has been little applied in the development, use and exploitation of our natural resources. Who can tell what the Tennessee Valley might have been today, what population it might be supporting or what standards of living might have been attained if the stitch had been taken in time? It is folly, however, to speculate on what might have been. We are confronted with the reality of what can be done to correct past mistakes and to prevent future ones. This is what the Government is doing in the Tennessee Valley under the inspiration and leadership of a far-seeing President. Here is a vast experiment in land planning and the development and rehabilitation of natural resources. For the task, the Federal Government has created the Tennessee Valley Authority and under its leadership, has marshaled its forces of engineers, scientists and economists. In this undertaking, it is quite natural that the Forest Service of the United States Department of Agriculture must take a prominent place since a large part of the region consists of water-

The Tennessee Valley contains such lofty mountain ranges as the Great Smokies and the Unakas, with more than forty peaks over six thousand feet high. When the white man first came to this country, most of the Basin was covered with a dense stand of timber—an unbroken forest, rich in its variety of tree species.

sheds which can best be protected by forest growth and much of the land will serve its highest use in the production of successive timber crops.

The Tennessee River Basin above Muscle Shoals, Alabama, contains about nineteen and one-half million acres, over one-third of which is in Tennessee, with smaller portions in North Carolina, Alabama, Virginia and Georgia. Through the center of the basin is the Valley itself, at a general elevation of about one thousand feet. It is made up of a series of long, narrow minor valleys following stream courses with intervening low ridges which rise often with steep slopes from three hundred to five hundred feet above the stream levels. On the north, the country rises sharply to the rim of the basin and forms the Cumberland Plateau with an average elevation of about four thousand feet. It is rough, mountainous country deeply dissected by short, steep and rapidly flowing streams.

To the east and south the Valley gives way to the even more rugged Blue Ridge in Tennessee, North Carolina, and Georgia. It contains such lofty mountain ranges as the Great Smokies and the Unakas and has within it more than forty peaks above six thousand feet. The highest, Mt. Mitchell, in North Carolina, has an elevation of 6,684 feet. Probably less than ten per cent of the Blue Ridge portion of the basin is fit for permanent agriculture although considerably more has been cleared of timber and consists of exceedingly poor mountain farms. From Chattanooga west to Muscle Shoals, the river drains a portion of the Cumberland Plateau with extensions into north Georgia and Alabama—the Highland Rim, a broken narrow plateau giving way to gentle rolling country known as the Central Basin.

Into this Valley came the White men about 1750. They were hunters and trappers and found there one of the finest forests in eastern America. Settlers from Virginia, North Carolina and South Carolina soon followed and the clearing of forests began in order to make way for crops. By 1815 settlers were scattered over the more accessible portions of the basin. A lumber industry developed about 1870 when logs cut from the more accessible and valuable species were driven down the Tennessee River. Aided by rail transportation in the decade 1880-90, lumbering became an industry of first importance. Cutting of timber without regard for the future coupled with the attendant forest fires, and the clearing of steep slopes for agriculture have seriously depleted the timber resources and the protective influence of the forest. Early cuttings removed only the most valuable species, but repeated cuttings have gradually converted the forest into one composed largely of weed species.

Very little of the mountain land is devoid of some form of forest cover except where cleared for cultivation. Through past abuse, however, much of the forest cover is sparse, tree growth is stunted, soil fertility is markedly depleted and the normal ground cover, so essential to conserve rainfall, has been largely destroyed. In addition much land which should be supporting forests as the only feasible crop has been cleared for cultivation and through erosion is contributing to the unsatisfactory conditions in the basin. As a result, the streams run yellow with heavy loads of mud, tremendous quantities of silt find their way to the lower stream courses and floods have increased. This condition could be largely corrected through the reestablishment of proper soil and forest conditions on the more rugged portions of the basin.

Until the last decade only small areas of timber land were under public management and even now the publicly owned lands comprise less than seven per cent of the basin above Muscle Shoals. Depletion of the natural resources has progressed to such an extent that it will take many years and heavy expenditures to bring back the forest areas to full production. Private owners will neither wait so long nor incur the necessary expenditures to rehabilitate these areas. On the other hand, it would be folly for the Federal Government to spend millions in social rehabilitation, dam construction and other engineering works without taking steps to protect the watersheds. The situation calls for a large expansion in public ownership and management within the basin.

The nineteen and a half million acres of land in the basin above Muscle Shoals may be roughly classified as follows: Agricultural and urban, six and a half million acres; submarginal agriculture, one and a half million acres; farm woodlands, four million acres; other forest lands, seven and a half million acres. The urban property and true agricultural land will, for the most part, remain in private ownership and need not be considered in a discussion of the forest. There remain thirteen million acres of present or potential forest lands none of which is suitable for agriculture and all of which should be placed or remain in forest. Of this area, approximately one and a half million acres are in public ownership and the remaining eleven and a half million acres are in private ownership. It is now proposed that three million acres remain in private ownership, one million acres pass into State ownership, and nine million acres be acquired by the Federal Government.

Private ownership has already demonstrated that it will not give the kind of forest management required and therefore a large part of these lands should find their way into public ownership. This is especially true of the larger timber holdings. Some four million acres of timberland in private ownership, however, consists of farm woodlands, widely scattered throughout the valley and mostly intermingled in small tracts with agricultural lands. Except as these are in comparatively large blocks with submarginal agricultural lands which should be taken out of cultivation, it would not be practicable to take them out of private ownership. The problem here is one rather of educating the present owners in proper forest management. This can be done through effective extension activities by state foresters, extension foresters and county agents. Upon readjustment of land ownership, most of the three million acres to remain in private ownership will be woodlands attached to farms.

Undoubtedly the states should participate in this development through the ownership and management of state forests and parks. In general, however, the states within which the basin lies, are financially unable to acquire and administer large areas of forest lands. Some tax-reverted lands could be made into state forests or parks, but it does not appear that the states can assume the heavy financial responsibility necessitated by the problem. The acquisition of the million acres proposed for them is probably as far as they could be expected to share in the project.

The large burden of rehabilitating these lands must necessarily fall upon the Federal Government and it is proposed that it acquire and manage seventy per cent of the present and potential forest lands of the basin above Muscle Shoals.

Present Federal ownership of forest lands consists of the Smoky Mountain National Park, the Qualla Indian Reservation, and portions of five National Forests—the

The tragedy of the wreck of much of this high country—utterly unfit for permanent agriculture — is demonstrated here in the Ducktown Basin, in Tennessee. Cleared of its forests and eventually abandoned, the earth has eroded away to great depths on the hills.

A scene of devastation on the slopes of Mount Mitchell, in the Pisgah National Forest in North Carolina—highest of the peaks, with an elevation of 6,684 feet. Fires swept through repeatedly after destructive logging. Only complete protection and extensive artificial reforestation can restore the forest cover of the slopes of this monarch peak.

In the National Forests, timber stands are improved and where desirable, young trees are planted. This is a planting by the Forest Service in the Nantahala, in North Carolina, of eight-year-old white pines. For such work, much temporary labor is needed and many local people find employment on the Forests during periods when they can leave their farms.

That "anxious moment" for this Waltonian in the waters of the Upper Davidson River, in the Pisgah National Forest in North Carolina. Some of the best hunting and fishing grounds in the East are found here.

Alabama, Cherokee, Nantahala, Pisgah and Unaka—a total of about one and a half million acres. It is probable that there will be some expansion in National Park lands and possibly some purchases for special purposes such as game refuges but, by and large, purchases by the Federal Government will be for watershed protection and timber production. Undoubtedly, the Tennessee Valley Authority will desire direct control, through ownership of some of the most critical forest areas in the immediate vicinity of reservoirs or of areas needed in connection with community development in the valley itself. The great bulk of these lands, however, can best be managed as National Forests.

Long before the Tennessee Valley project was considered, the Federal Government had established several National Forests in the Appalachian Mountains for watershed protection. To date about 900,000 acres of forest land have been purchased. Recently, at the request of the Tennessee Valley Authority, the entire Appalachian Mountain portion of the Tennessee Basin, as well as the head of the Clinch River, have been placed into National Forest purchase units and purchases of land are being made within them. It is believed that a total of approximately four and a half million acres may be acquired within these units within a reasonable time. The establishment of purchase units in the Cumberland Plateau and in the rougher portions of the western part of the basin are also imperatively needed. Probably between seven or eight million acres of forest and submarginal agricultural lands should ultimately find their way into National Forest ownership in order that the project may be given adequate protection.

The Forest Service program does not contemplate the purchase of all of the land within the purchase units. There are towns, small communities and many farms within them, which should, of course, remain in private ownership. Its policy has been to make each piece of land within the National Forest serve the highest usefulness and it will not attempt to purchase urban property or true agricultural lands. In fact, it is considered undesirable to extinguish all private ownership and settlement within the National Forests, both because the Government has need for temporary labor and because some lands can and should be put to a higher use than timber production. As lands are acquired they are put under protection against forest fires. Improvements such as lookout towers, telephone lines, roads and trails become a necessity and are constructed. An organization to prevent and extinguish fires during dry periods is placed upon the lands. Development of the areas follows. Timber stands are improved through silvicultural practices and salvage material is sold. Where necessary, young trees

The forests of the Basin are composed of a large variety of species, and thus offer greater possibilities of diversity of employment than if the forests yielded only lumber of one particular kind. These are piles of chestnut—extract wood—on Bear Branch in the Unaka National Forest in Tennessee.

Photograph by W. J. Velsor.

At the junction of the Nantahala River and the little Tennessee, in the Nantahala National Forest, where forested watersheds serve to regulate streamflow and at the same time provide beauty and recreation.

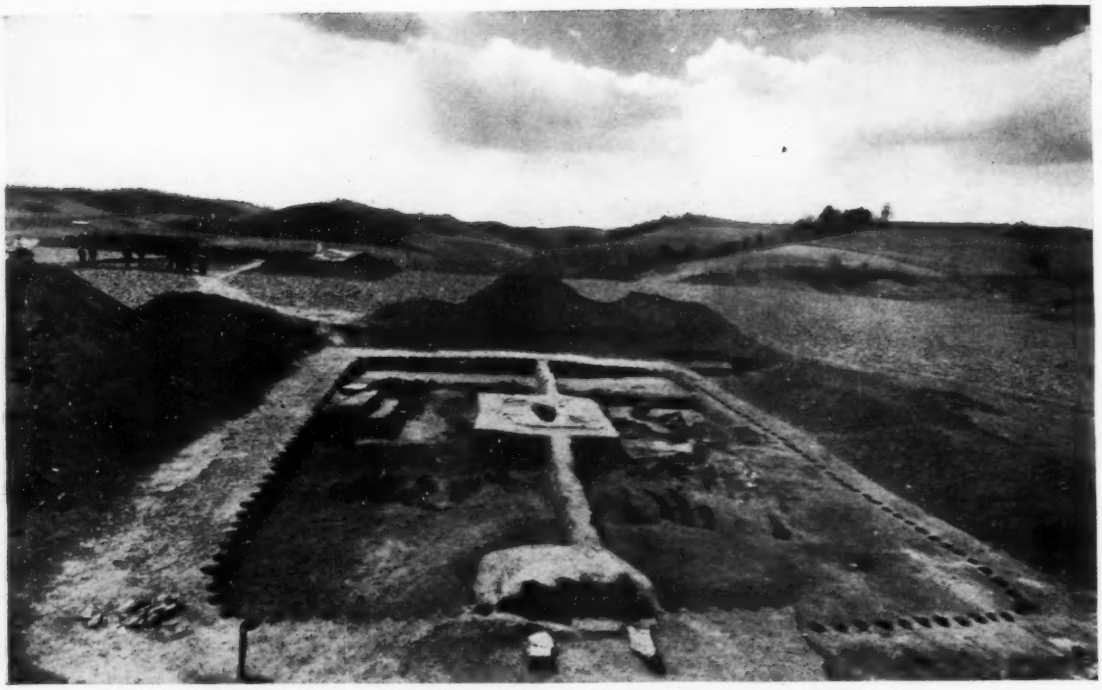
are planted. For this work a considerable amount of temporary labor is needed and many local people find employment on the National Forests during periods when they can leave their little farms.

Many of the mountain farms within the Appalachians are submarginal for agriculture and should be taken out of cultivation. Such places the Government should buy and put into timber. There are also some valleys with good agricultural lands to which the mountain farmers can move or where present farmers should remain to form communities dependent partly on their crops and partly on the work available in the National Forests. The problem is one not so much of extinguishing settlements within these forests as of shifting population to better agricultural lands and of building permanent rural communities dependent in part on the forest. It is this phase of the problem which the Forest Service and other Federal agencies must attack more seriously than in the past.

Provided the present plans of National Forest development in the basin are carried out, the Appalachian Mountain section and the headwaters of the Clinch will come under Government ownership and be protected. In addition, National Forest acquisition and development should be extended to include about two million acres in the rougher portions of the Cumberland Plateau and the southwestern portion of the basin in Alabama and Tennessee. This will afford watershed protection over most of the area of the basin above Muscle Shoals which should be permanently in forests. National Forest management will mean watershed protection and erosion control, and coordinated with these purposes, community development on a permanent basis with the lands put to their highest use.

Within the forests will be small rural communities dependent partly on their own crops and partly on the National Forest for income. As time goes on, sawmills will again be running on a large scale in these forests, but this time not to devastate the forests, but only to harvest the ripe crop. After cutting the forest will be left in a productive condition and the permanence of this lumber industry, with its dependent population, will have been established. In addition the areas will become large summer playgrounds where people from the warmer valleys may find rest and recreation as well as good hunting and fishing. Prosperity will again come to a country now largely devastated and community life will have been built on a sound and permanent basis.

The program of the Forest Service contemplates the full and appropriate use of special areas, by developing recreational possibilities of these beautiful Eastern forests, where people may find rest and renewal. This lone camper is on the Cherokee.



The foundations of a tribal temple were disclosed by excavation work in the area of the Norris Reservoir—part of an ancient fortified Cherokee village. These are the first temple sites found east of the Mississippi River.

PROBING THE RED MAN'S PAST

Archaeological Finds in the Tennessee Valley Throw Light on Early American Civilizations

SKELETAL remains of aborigines with skulls "entombed" in giant conch shells, traces of prehistoric temples and fortified villages, and artifacts of interesting variety are among finds made by the Tennessee Valley Authority in archaeological work preparatory to flooding the Norris and Wheeler dam reservoir areas. Excavation of Indian mounds and village sites is disclosing data valuable in solving some of the problems faced by students of this subject in the Southeast. The popular notion that Indians have no sentiment is disproved by certain discoveries in the Wheeler Dam basin, not far from Muscle Shoals, in Alabama. Here grave mounds have revealed remains of children bedecked with trinkets and buried with pipes and other prized possessions of adoring but bereaved parents.

Near the temple excavation, this dwelling site was uncovered. The post holes indicate the nature of the original structure.

The conch shells which encase the skulls of some of these early Americans are native only to the Gulf of Mexico. The lower half of the shell was skillfully cut away to accommodate the head and neck of the deceased, after which the upper portion was placed

(*Continuing on page* 498)

Primeval wilderness in the Greenbrier section—the largest wilderness area in the Park. In the background may be seen part of the magnificent Tennessee-North Carolina state range of the Great Smokies. At the left is Old Black. Next is Mt. Guyot,—6,621 feet high and second highest peak in the Park. Beyond the tip of the center tree is Mt. Chapman, bathed in clouds, while Woolly Tops is the peak in the right foreground.

THE GREAT SMOKY MOUNTAINS PARK

By CARLOS C. CAMPBELL
Photography by the Author

THE unique movement which led to the creation of a National Park in the hitherto little-known Great Smoky Mountains of Tennessee and North Carolina will go down into the record as of great importance, for history was made in the establishment of the Park. The leaders of this movement and the builders of this National Park have made history,—and important history.

The National Parks of the West—twenty of them—were created out of the Public Domain. Not so with the Great Smokies. Land for this, our newest National Park, was already in private ownership. It could not be "set aside." Furthermore, the Federal Government would not—could not—buy it. If it was to become a National Park it must be purchased by the citizens of the two states,—with whatever help they could enlist from other sources.

With an estimated cost of ten million dollars, the prospects were anything but bright, and lumber companies were busily engaged in cutting timber from certain beautiful sections of the desired area. Most of the region was still a primeval forest wilderness. If the timber cutting continued, that would be forever changed.

This condition called for immediate action. But—there was no money with which to make the purchases. The area had not even been designated as being desirable or acceptable for National Park purposes. A hopeless situation, it appeared to most people. That is what makes the final accomplishment of the difficult task of such outstanding importance,—the fact that a small group of people, working under inspired leadership, overcame such apparently insurmountable obstacles.

Col. D. C. Chapman, with a small group of loyal workers from both states, raised a purchase and promotion fund of one million dollars; got state appropriations and necessary legislation; and brought about the passage of an act by Congress providing for the establishment of the Great Smoky Mountains National Park. This highly condensed list of major steps in the long-drawn-out movement sounds easy, but only Col. Chapman and his closest associates know the hurdles that had to be cleared and the heart-aches and disappointments that had to be endured.

The appropriations made by the Tennessee and the North Carolina legislatures, together with the million dollars subscribed by individuals and firms, brought the available funds to a total of five million dollars—just half enough. After an unsuccessful nation-wide drive for the other half, the situation was saved by announcement of another five million dollars given as a memorial to Laura Spelman Rockefeller, mother of John D. Rockefeller, Jr. Land acquisition then started in a large way.

That the Great Smokies deserved to become a National Park is indicated by the public's response. Even in advance of its formal opening, and despite the confusion and the interruption to travel caused by the five-million-dollar road

Clingman's Dome—highest peak of all—and Mt. Kephart, in the heart of the Great Smoky Mountains National Park.

Deep in the untouched reaches of the Park lie places of wild beauty—crystal cascades and waterfalls—numberless, and often nameless.

Fishing is not only permitted but encouraged in the National Parks—and there are more than six hundred miles of fishing streams in Smoky Mountains Park! An open invitation and compelling lure to the nimrod. This is the West Prong of the Little Pigeon River.

An inspiring panoramic view from the winding road leading from Gatlinburg into the wilderness. There is a fire tower on the summit of Greenbrier Pinnacle.

Hundreds of miles of trails lure the hiker. This one, along the state line range, is a part of the Appalachian Trail—a 2,000-mile stretch from Maine to Georgia.

No matter how often one climbs LeConte, the spectacle below is always different. This time Cove Mountain peeps above the rolling, smoke-like clouds in the center background.

Yellow Poplar—Giant Trees of the Smokies

Driving through a Virgin Forest on Newfound Gap Highway.

A Game of Peek-a-Boo in Cloudland, from the Rocky Spur Trail.

A Lacy, Dreamy Waterfall in this Mecca for Nature Lovers.

A Flower-strewn Aisle through the Rhododendrons.

Horseshoe Bend of the Little Tennessee River, on the Border of the Park.

and trail building program, the Great Smoky Mountains National Park last year led all other National Parks in attendance.

This popularity is ascribed to the great number of natural attractions and to the proximity of the Great Smokies to so many centers of population. Of great interest is the fact that there is sufficient size (the Great Smokies are sixth in size in our chain of twenty-two National Parks) to permit the development of the area for widely divergent tastes. There are vast wilderness areas for the young and robust and for others who desire to escape the noises and other distractions incident to our machine-age civilization. There are a reasonable number of carefully built motor roads. One of these ascends Clingman's Dome, highest point in the Park and an elevation of 6,642 feet. And there are hundreds of miles of graded trails for hikers and horseback riders.

A veritable haven for fishermen is found in the 600 miles of sparkling streams which dash wildly down the rugged mountainsides. Almost every cascade or waterfall has at its base a pool filled with black bass, rainbow trout or brook trout, depending upon how far up the mountain it is. While hunting is never permitted in National Parks, fishing is not only permitted but is encouraged.

Botanists—professional or amateur—and nature lovers in general find much of interest in the highly varied flora of these mountains. It may, or may not, be true that the Great Smokies exhibit the world's greatest variety of flora. More investigation may be necessary to determine that. But it is generally agreed that few regions equal the Great Smokies in this respect. The best illustration of this great variety is that there are 152 kinds of trees in these mountains as compared to only eighty-five kinds in continental Europe. Dr. H. M. Jennison, botanist at the University of Tennessee, has listed over 1,500 kinds of trees, flowering shrubs and wildflowers in the Great Smokies and immediately surrounding region which bloom before June 1.

The Great Smokies contain "the largest and finest virgin hardwood forest in the United States, also the largest virgin forest of red spruce," according to the National Park Service. Many visitors are surprised to find here, in the heart of the South, the red spruce and balsam which are native to New England and Canada. The southernmost habitat of these trees of the North Woods is in the center of the Great Smokies near Clingman's Dome, which is the highest point in the Park.

"ON TO KNOXVILLE"!

This issue of AMERICAN FORESTS, which is dedicated to the Tennessee Valley, is the prelude to a larger opportunity to become acquainted with the region and the work of the Tennessee Valley Authority, when this month The American Forestry Association will hold its fifty-ninth annual meeting at Knoxville. Plans for a three day meeting devoted largely to field trips and conducted in cooperation with the Tennessee Valley Authority, the United States Forest and Park Services and the Forestry Departments of the Valley states, have been completed and a program of eminent speakers arranged. The headquarters for the meeting will be the Andrew Johnson Hotel at Knoxville.

The opening event will be a banquet at the Andrew Johnson Hotel at 7 o'clock the evening of Wednesday, October 17. The banquet is being arranged under the auspices of the Great Smoky Mountain Hiking Club. Mr. Guy Frizzell, President of the Club, will act as toastmaster, and the speakers will be Dr. Arthur E. Morgan, Chairman of the Tennessee Valley Authority and Mr. Henry S. Graves, President of The American Forestry Association.

On the morning of Thursday, October 18, a caravan of automobiles will be at the hotel at 8:30 to take those attending the meeting on a Valley tour to view the work now underway by the T. V. A. in the construction of the 250-foot Norris Dam, the development of the model town of Norris and the Forestry Division's Tree Crop Nursery. Special guides will explain the details of the work. The noon luncheon will be at the T. V. A. cafeteria in Norris, following which the group will assemble at the Norris Community Hall to be addressed by Mr. Earle S. Draper, Director of the Division of Land Planning and Housing, and Mr. Edward C. M. Richards, Chief Forester of the Division of Forestry and Soil Erosion. Upon completion of this assembly, the group will return to Knoxville.

Following dinner at 8 o'clock an assembly will be held at the Andrew Johnson Hotel, with Mr. James G. K. McClure, Jr., President of the North Carolina Forestry Association, acting as Chairman. The speaker of the evening will be Mr. F. A. Silcox, Chief of the United States Forest Service. Following Mr. Silcox's talk, the meeting will be open for discussion.

Friday, October 19, will provide another field trip by automobile, including a tour of the watersheds of the Clinch and Powell Rivers above Norris Dam where a bird's-eye picture may be obtained of the region and some of the work that is under way, including control projects in soil erosion. Field talks will be made en route by Mr. Gus H. Lentz, Planting Chief, Mr. John E. Snyder and Mr. J. H. Nicholson, Erosion Engineers of the T. V. A.

At noon on this day an interesting and unique luncheon will be held at the Civilian Conservation Corps Camp at La-Follette. This event will be broadcast over a national network by the National Broadcasting Company as its National Farm and Home Hour weekly program. Brief talks by Dr. Arthur E. Morgan, General George V. Moseley, Commander Fourth Corps Area, War Department, Mr. Henry S. Graves and Mr. F. A. Silcox, will be interspersed with local talent drawn from the C.C.C. camps of the Valley. The event promises to be a colorful one.

Another assembly will be held the same day at the Andrew Johnson Hotel at 8 o'clock in the evening. Mr. James O. Hazard, State Forester of Tennessee, will be chairman of this session, and Mr. Jay N. Darling, Chief of the United States Biological Survey, and Mr. Robert Marshall, Chief Forester of the United States Indian Service, will be the speakers. Mr. Darling will discuss wildlife and Mr. Marshall will talk on the possibilities of forest recreation in the Valley.

Saturday, October 20, will be given over to a visit to the Great Smoky Mountains National Park. Leaving the hotel at 8:30 in the morning, automobiles will take the group on a scenic trip of about seventy-five miles through a portion of the four hundred thousand acres of the park to Newfound Gap, one of the more scenic points in the new park. Here Mr. Arno B. Cammerer, Director of the National Park Service, will address the group and explain plans underway for development and administration of the park. This luncheon will end the meeting.

Those who desire to remain in order to see more of the Park will find comfortable accommodations at the Mountain View Inn at Gatlinburg, Tennessee, where special rates of $3.50 to $4.50 a day for room with bath and meals will be granted. Reservations for accommodations at Knoxville during the meeting and at Gatlinburg following the meeting should be made by writing either to The American Forestry Association, Washington, D. C., or directly to the hotels concerned.

The Hermitage—home of Andrew Jackson near Nashville and now a national shrine. The first Hermitage—a log cabin built in 1804,—still stands near the present mansion. The second Hermitage—this house minus the wings, was built in 1819. Partly burned in 1834, it was rebuilt on the same foundations and the wings added. The outbuildings, kitchen and store houses in the rear, were not injured by the fire.

TREES OF THE HERMITAGE

By MARY F. ANDERSON

Photographs by courtesy of the Ladies Hermitage Association

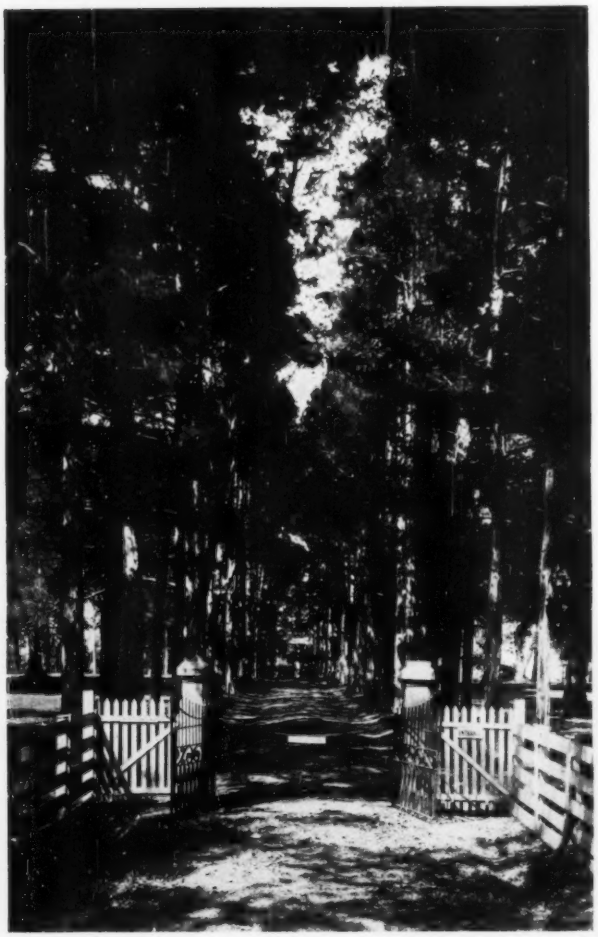
"GENERAL JACKSON thrust his staff in the ground, 'n' dese here trees sprung up in de prints!"

In such a strain, Uncle Alfred, favorite slave and body-servant of the seventh President of the United States would relate to interested visitors the origin of many of the trees at the Hermitage, the Jackson homeplace, twelve miles from Nashville, Tennessee.

When less dramatically inclined, the old negro would explain that it was a habit with General Jackson to fill his pockets with chestnuts and walnuts when starting for a stroll about the place. When he came to a suitable spot he would dig the end of his walking stick in the ground, drop a seed or nut in the hole, then push the loosened dirt over it with his foot. According to the present custodian of the Hermitage, T. L. Baker, who has been in charge thirty-eight years and remembers many of the stories told by Uncle Alfred, many of the Hermitage trees owe their start to such an impulse of "Old Hickory's" walking cane.

The Ladies' Hermitage Association, which has held guardianship over the estate since 1889, has sought to preserve everything there that was associated with Jackson. The house contains the original furniture, and one room serves as a museum to hold the gifts that came to the hero of New Orleans from all corners of the earth. In the kitchen, coach house and cabins are preserved implements that were used about the farm. But of more than passing interest are the trees and shrubs which the master of the Hermitage planted and which receive the solicitous care of their guardians. The life and color of the trees lend the place much of its charm. Without them the setting of the house would be desolate and melancholy, as it has not been used as a home for nearly three-quarters of a century.

On the Hermitage lawn may be counted twenty-eight different kinds of trees. Across the fence in the garden there are more. There are flowering trees whose blossoms make of the grounds a riot of color in the Spring and Summer—dogwood, redbud, magnolias, catalpas, black locusts and several kinds of poplar. Then there are the cedars, pines, hemlocks, live oaks and holly that hold their soft green throughout the year. Scattered about are a goodly number of fruit trees—cherry, pear, plum, apple and fig. Jackson's main plantings, however, were the trees that he brought in from the sur-



A quarter-mile avenue hedged with cedars which President Jackson planted leads from the front gate to the guitar-shaped lawn which it encircles, as it approaches and passes the front of the house.

rounding forest—the elm, chestnut, walnut, hickory, sycamore, willow, thorn, mulberry, beech and several kinds of oaks and maples. In fact, the Hermitage assembly of trees contains a fair representation of some of the most valuable trees native to Middle Tennessee, a region affording some of the finest hardwood areas in the world.

Of special importance in this limestone section of Tennessee is the red cedar. Because the wood does not decay readily and was found in abundance, it became the pioneer's choice for fence rails and posts. Several years ago a market was opened near the Hermitage for these old cedar rails, many of which had already weathered more than a century, and they became the basis of a new enterprise in that part of the State—the manufacture of cedar lead pencils.

One of the most striking arboreal features at the Hermitage is the famed guitar driveway. A quarter-mile avenue leads from the front gate to the lawn in front of the house. There it divides, encircles the oblong lawn, curving outward, inward. then outward again describing the shape of a guitar with its base in front of the house. Jackson hedged his guitar driveway with cedars. He also planted other rows of the same stately tree parallel to the driveway on each side of the lawn from the road to the house. Several years ago a storm wrought havoc among the stalwart evergreens and about two dozen of the original trees were uprooted or splintered so they had to be removed. In their places young cedar trees have been set to continue the fanciful design started by Jackson.

While Jackson used formal cedars to ornament the front of his premises, he chose the friendly maple, which accomodates its shade to the needs of the season, for his back yard, and to shade the walk that leads to the springhouse. At intervals between the maples are weeping mulberry bushes and yuccas. At the end of the maple-shaded walk rustic tables have been built and picnic grounds have been established. Visitors to this home-shrine of one of America's greatest men may eat their lunches in the grove, and serve themselves with water from the spring that supplied the first Hermitage.

The Hermitage garden contains many rare shrubs and trees that Jackson accumulated in his journeys about the country. Over the gate a fringe tree drapes its graceful limbs, and near it is a smoke tree standing beside a pur-

Six tall hickory trees stand—a guard of honor—flanking the tomb of Andrew Jackson where he sleeps beside his wife in the garden at the Hermitage.

ple magnolia. A Judas-tree, not far from the gate, was the gift of a friend who had traveled in the Holy Land. Four large magnolia trees stand near the grave-plot in the corner of the garden. Crepe myrtle, altheas, lilacs, snowballs, syringas, bridal-wreaths and calycanthus shrubs have grown almost to the size of trees.

Like other frontier homes, the Hermitage garden held shrubs, cuttings and bulbs which the settlers had brought with their meager belongings from their old homes in Virginia or North Carolina. They were treasured tenderly and divided generously when new homes were started in the wilderness, to become living links connecting the advancing frontier lines.

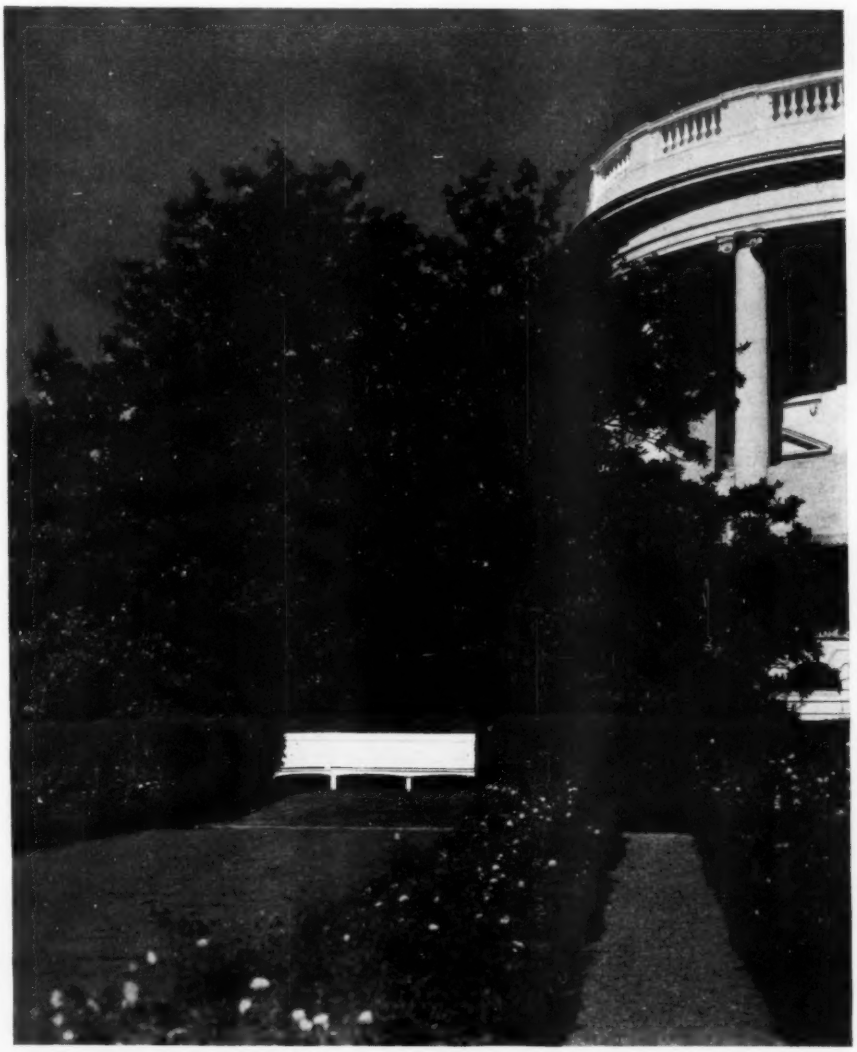
The garden of the Hermitage belongs to a period when the poetic side of life was in its ascendancy, and flowers were commonly the means of conveying tender sentiment. Every flower had a meaning with which young people were acquainted. Flowers and plants from neighbor's gardens expressed good-will. They were never sold but were gifts from friend to friend. Lovers expressed their devotion through correctly chosen flowers, as pressed flowers in yellowed old books reveal to this day. Sorrow, too, was expressed in floral terms.

Jackson, as a gardener, has left a record of an understanding and appreciation of many principles of the art of gardening. While his acre-plat of ground adjoining his yard became a receptacle of gift plants, he utilized the plant life of the region about the Hermitage as the basis of his planting. There were bluebells brought from the Cumberland cliffs and yuccas from the surrounding glades. The rock-rose, with its golden flowers, was another capture from the rocky glades, and the orange-colored butterfly plant and the beautiful spirit lily were transplants from the native woodland.

An arbor in the garden is still trellised with wild honeysuckle, woodbine and climbing roses, descendants of those Uncle Alfred set out for "Mis' Rachel." The fragrant hundred leaf rose has overrun some of the flower beds and even thrust its sprouts, trespassing, into the gravel walks. The musk cluster, the pink cluster, and the old-fashioned daily rose that Rachel Jackson loved have presented a perennial pageant of blossoms for more than the hundred years that she has been away.

In their season the flowers may be cut by the wagon load. When the Ladies Hermitage Association took over the place, the harvest of the garden became a source of revenue to help in the rehabilitation work. Various members, serving on the flower committee, stood on the Nashville streets and sold flowers freshly cut from the garden. They also took orders for roots and bulbs which definitely augmented the association's funds.

The trees and shrubs at the Hermitage are living evidence of the pride that General Jackson took in his home — a place for whose peace he often expressed a longing while living in Washington during the stormy days of his Presidency, and toward which



No President's wife has had a more beautiful memorial erected in her honor than has Rachel Jackson in the group of magnolias near the south entrance to the White House. The trees were brought from the Hermitage in Tennessee and planted, shortly after her death, by President Jackson. "Something green,—in her memory," he wrote to her niece. They were planted under his windows where he could see them, green throughout the winter and fragrant with bloom in the spring.

his heart yearned in the turmoil of official life.

One of the most fascinating figures in our history, "Old Hickory" was the first President of the United States to come from west of the Appalachian Mountains—a homespun product of American frontier life. After driving troublesome invaders from our southern border States with a group of untrained Tennessee and Kentucky backwoodsmen, Jackson was swept into the White House on a wave of popular appreciation. His election to the presidency has been called the rise of the people of the country to power in government affairs—the fulfillment of the spirit of the Declaration of Independence.

When he married two years after he came to the new settlement on the Cumberland, Jackson built a home near Nashville on a tract of land called Hunter's Hill. His modest house differed little from others in the sparsely settled community, except it was a frame structure in the days when anything but a log cabin was regarded as a curiosity.

As the Jacksons were beginning to feel comfortably rooted at Hunter's Hill there came a setback in which his home was lost. To pay a large debt incurred by another required the raising of a large sum of money, currency that could be used in Philadelphia, instead of the articles customarily used in settling debts in the wilderness. To meet the obligation, the Hunter's Hill tract and additional land approximating 25,000 acres of land were sacrificed.

Then the Jacksons moved farther back into the wilderness where another spot was cleared. A square two-story log house was built which contained one large room on the ground floor and two rooms above. To this was added about twenty feet away a small structure containing kitchen, dining and weaving rooms joined to the main building by a covered passage.

For fifteen years this log house was Jackson's home. From it he went forth in 1812 an almost unknown frontiersman, and to it he returned after the Battle of New Orleans, a widely acclaimed hero.

The first Hermitage, later cut down to one-story, provided material for a group of negro cabins, still standing not far from the mansion which succeeded to its name. One may still see the trap door in the floor under which Rachel Jackson stored her fruit and vegetables in an improvised cellar, its unceiled rafters and walls blackened with the smoke and dust of a century and a quarter. The yawning fireplace with its immense chimney offers indisputable evidence to the claim that it could consume a cord of hickory wood at one time.

The second house called the Hermitage was built in 1819. General Jackson had returned from the Seminole War, broken in health and feeling that he had only a short time to live. He wanted to leave Mrs. Jackson as comfortable as possible, so immediately he set about to build a more commodious residence. A brick-kiln was set up on the place and a saw-mill began to turn out lumber for the construction of the new house. General Jackson, leaning heavily on his cane, hobbled daily to the place to watch the building and began slowly to regain his health. When the house was completed it was by far the most imposing in the community. It was like the present structure, except there were no wings at the ends of the porch.

The second house was where Lafayette was entertained in 1825, and it was from this house that Jackson was called to the Presidency. While he was in Washington, the Hermitage was burned in September, 1834. It was rebuilt at once upon the same foundations, and by May of the next year it was ready for occupancy. The kitchen and smokehouse were not damaged and portions of the old wall were incorporated in the new structure. To raise the necessary $3,000 for the rebuilding, the President had to sell the last piece of land that he owned that was not included in the Hermitage tract.

Two months before Jackson's inauguration, Mrs. Jackson died suddenly. The President-elect buried his adored wife on Christmas Eve in a corner of the Hermitage garden and a few weeks later grimly set out for Washington. His last act before leaving to take up his presidential duties was to plant four willows, something that would grow, about her last resting place. He never lost interest in the garden nor the willows in his long absence from the Hermitage. On May 19, 1832, he wrote to Mrs. Sarah Yorke Jackson, his daughter-in-law:

"I sincerely regret the ravages made by the frost in the garden, and particularly that the willow at the gate has been destroyed. This I wish you to replace. The willows around the tomb I hope are living, and a branch from one of these might replace the dead one at the garden gate. It will grow if well watered and planted on receipt of this."

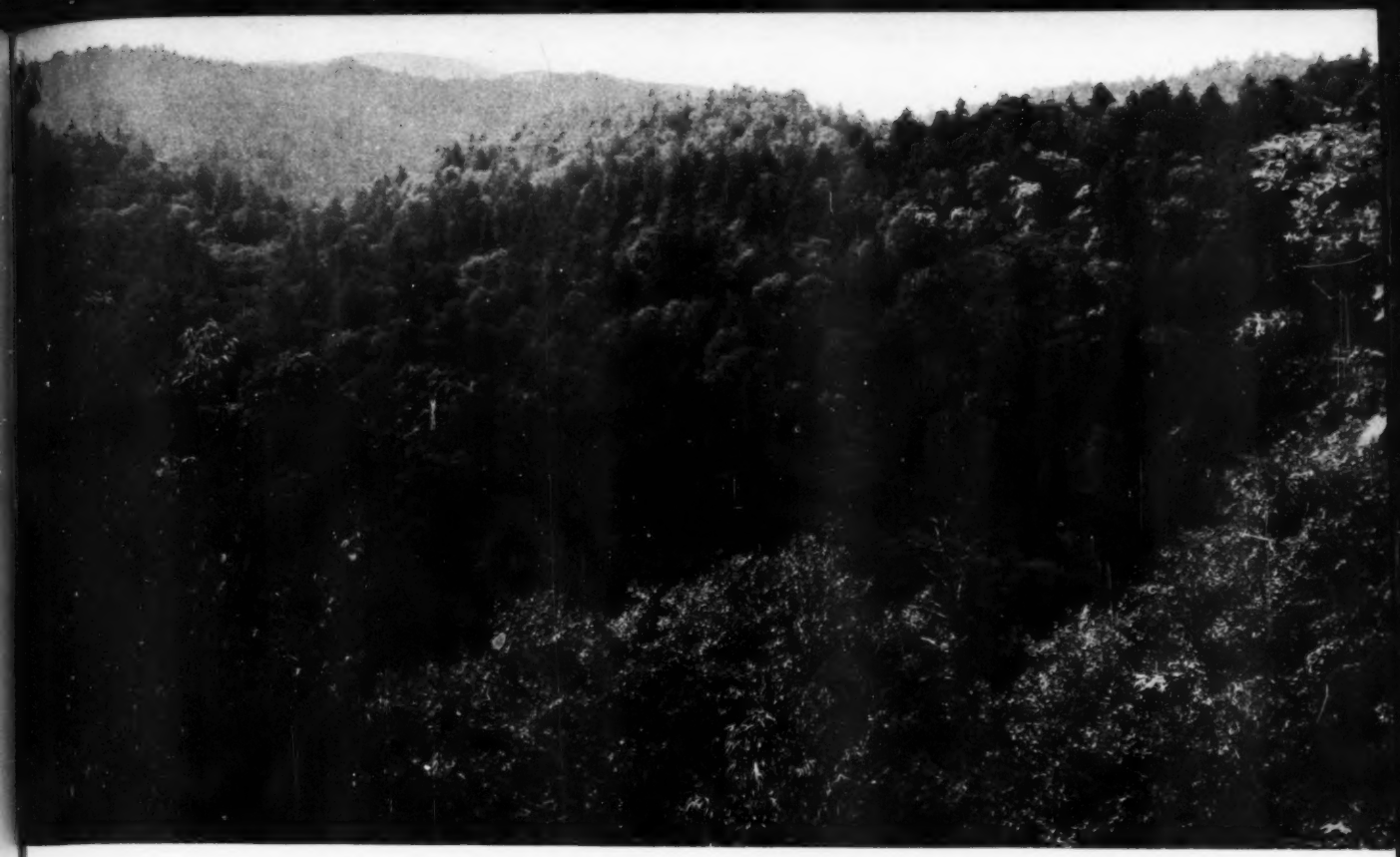
After the expiration of Jackson's second presidential term, he lived at his Hermitage retreat, where his heart lay buried. He took an interest in political matters to the last, but seemed more immediately concerned with pruning his fruit trees, tending his hedges, and spending quiet hours in his garden, watching the seasonal procession of flowers. On one side of Mrs. Jackson's tomb he planted a group of magnolia trees, and on the other side a line of hickories. When he died in June, 1845, he was buried beside Mrs. Jackson in the garden, and six tall hickory trees stand as a guard of honor near the tomb.

The word hickory became a synonym for General Jackson's name. It was on the homeward march to Nashville in 1813 which ended the Natchez expedition that Jackson was given the name "Old Hickory." It was not an instantaneous bestowal, but came by degrees. A soldier, struck by his commander's physical endurance, remarked that General Jackson was "tough." Another later made the remark that he was as tough as *hickory*. That seemed a fitting name, and soon the men up and down the lines were calling their commander "Hickory." That was too brief and unqualified. Soon the prefix *Old* was affectionately added, and Jackson became "Old Hickory"—a nickname that stuck to him through life.

Wood, and hickory, especially, figured in many gifts that came to General Jackson after his military triumphs. In the dining room at the Hermitage is the "Eighth of January mantelpiece." It is made of hickory sticks from the fort at New Orleans where the celebrated battle was fought. No work was done on the mantel except on the one day of the year—the eighth of January—and it was presented to "Old Hickory" at one of the anniversary celebrations on the eighth of January. Before an iron fence was placed inside the dining room door the mantel was almost destroyed by souvenir hunters.

Two chairs were gifts of wood that Jackson treasured,—one made from the timbers of the frigate *Constitution*, and the other a gift from Chief Justice Taney. Both chairs are now in the Hermitage library. A phaeton, made from the wood of the *Constitution*, was another. Besides these there was a curious wooden pitcher, holding not more than a quart, but composed of 750 staves from the venerable elm under which William Penn made his famous treaty with the Indians. The hoops, lid and handle were of silver, and the bottom was a magnifying glass, through which he could see the joints of the vessel, which to the naked eye were invisible. This unusual gift was from the coopers of Philadelphia.

"Old Hickory" was the name of a goblet made from a hickory tree which had sprouted from where a cannon ball had severed the parent stem dur- (*Continuing on page* 498)



The Tennessee Valley is a meeting ground of over a hundred species of forest trees. Two-thirds of its entire area is today forest land—lumbered mountainsides, untended farm woodlands and a few stream heads of magnificent virgin forests that man and fire have not despoiled. To restore the forest growing wealth of this vast area and to make it contribute to the prosperity and happiness of local community and farm life is essential to the ultimate success of the Valley project.

The Role of Forests in the Tennessee Valley

By

EDWARD C. M. RICHARDS

Chief Forester, Tennessee Valley Authority

AMERICANS are a wide awake people. New things, great projects, large enterprises lure them with irresistible force. So today the people of the United States are trekking South into the great basin of the Tennessee River to see what the far-famed Tennessee Valley Authority is doing. Interest in the undertaking is natural, for not only is the Government planning and actually building a great hydroelectric power system, but the T. V. A. is striving to plan the social and economic use of other natural resources of the basin. In a word, the conservation of natural resources of all kinds on a region-wide scale is being undertaken as a concrete project at one time.

What are some of the outstanding facts touching upon forestry and kindred matters in the valley of the Tennessee River? Briefly the picture may be sketched as follows: Extending from the border of West Virginia, southwestward across western Virginia, eastern Tennessee, western North Carolina, northwest Georgia and northern Alabama, the basin turns north, through a corner of Mississippi, recrosses Tennessee, and passing through a part of western Kentucky, empties into the Ohio River at Paducah. The entire Tennessee Valley covers an area slightly less than 28,000,000 acres—about the size of Pennsylvania—of which 18,000,000 acres or sixty-three per cent is forest land. One-third of the forest area, or 6,000,000 acres, is in farm woodlands scattered over the Valley, while a large part of the remainder is mountain forest in the Appalachian Range forming the eastern edge of the basin. Large blocks of forest also occur on the watershed of the tributary Duck River in western Tennessee and on the edges of the Cumberland Plateau along the northern rim of the Valley. Smaller forest areas cover the top of many of the long narrow ridges found frequently in the basin.

On the high mountain tops of the Great Smoky Mountains are found the spruce, balsam, beech, birch, and maple forests of northern New York, New England and southern Ontario and Quebec; lower down in elevation, white pine, Table Mountain pine and hemlock. As one continues to descend, the famous forests of temperate zone hardwoods claim the land—red, white, black and other oaks, yellow poplar, basswood, wild black cherry, black gum, cucumber, black locust, and other species, with such

A fine stand of second-growth shortleaf pine growing on once abandoned and eroded farm land, illustrates the timber producing possibilities of the Valley.

softwoods as shortleaf pine, hemlock, Virginia scrub pine, red cedar, and pitch pine. On the main valley floor above Chattanooga the forests are a composition of oak, hickory and pine in varying mixtures. Into the lower Valley in Alabama the southern Coastal Plain type of forests appears with loblolly pine, oaks, sweet and black gums and occasionally a small tupelo and cypress swamp. In general distribution and variety of species, therefore, forests in the Tennessee Valley represent a highly important form of land use.

Owing to intensive settlement through several generations, practically all the original virgin forest is gone. Much of what is left fortunately is located within the Great Smoky Mountains National Park and in western North Carolina. Elsewhere in the Valley, the forests with occasional exceptions are heavily culled, badly burned, second growth. As in much of the eastern United States, the Tennessee Valley forests have been mined out, neglected and reduced to low productivity. Potentially, however, the wide variety of forest types and tree species, the abundant rainfall of from forty to over one hundred inches a year, the excellent soils and the long growing season make the Valley as promising a region for the development of sustained forest production as any in the United States.

The 1930 census figures show that of a total of 156,609 people working in all manufacturing establishments in the Tennessee Valley, approximately 28,000 are engaged in wood-using industries. The number of persons employed in the woods is 5,500, making a total of 33,500 people engaged in forest activities in the Valley. The wood-using industries include sawmills, pulp and paper mills, hardwood distillation plants, tanneries, wood-preserving plants, cross tie and pole producers, veneer plants, dimension plants, furniture factories, manufacturers of caskets, boxes, crates, flooring, pencils, vehicles, agricultural implements, wood turnery, and miscellaneous products. The development and maintenance of all forms of wood-using industries which can be made to fit into the productive capacity of the region on a sustained yield basis, will be made possible through the planned use of the forest.

The Great Smoky Mountains National Park of nearly one-half million acres embraces some of the headwaters of the Tennessee Valley and with them the most beautiful virgin forest of the southern Appalachians. The Park assures the protection of this forest in its primitive form as an open air museum of forests such as Daniel Boone passed through when he first crossed the mountains and paved the way for the settlement of the west. These forests of the Great Smokies are unique and priceless and it is encouraging that America is to preserve their wilderness beauty undisturbed for all time.

What progress has permanent forest management made in the Tennessee Valley? In addition to the National Park, there are five National Forests of over a million acres—the Pisgah, the Unaka, the Nantahala, the Cherokee and the newly organized Clinch. These Federal Forests lie along the Appalachian Mountain Range from Alabama on the south to Virginia in the north. While the National Park is under the administration of the National Park Service, the National Forests are managed by the United States Forest Service and are devoted to promoting the general public interest, with watershed protection, timber growing, recreation, wildlife development and the welfare of the

Forests in the Tennessee Valley represent so important a form of land use that the first objective of good forest practice must be to prevent such tragic loss as is shown in this picture of flame-swept woods.

nearby population, all receiving due consideration. Last spring when funds became available for additional purchases of land for National Forests, a conference was held in Knoxville resulting in a letter to Secretary Wallace, of the Department of Agriculture, requesting in the name of the Board of the T. V. A., that additional purchases of land for National Forests be made in the Valley. This request has been granted, so that upwards of 3,250,000 more acres of land will be bought and added to the present Forest areas, making about 4,650,000 acres of the forests of the whole Valley, or a little over twenty-five per cent, assigned ultimately to the care of the Federal Park and Forest Services.

Seven states are included in the Tennessee Valley—Virginia, North Carolina, Tennessee, Georgia, Alabama, Mississippi and Kentucky. Under the forestry organizations of these States, the cause of forestry and related conservation is being advanced. Cooperative forest fire protection, soil erosion control and conservation are active parts of the work of the state departments. The establishment of State Forests, while only beginning, is making real progress. Tennessee established three State Forests this past year and plans look to more active development. In the same way, progress is being made in the creation and development of State Parks.

The use of forest land close to towns, cities or other communities for small sized public forests is highly developed abroad and has made considerable progress in some parts of the United States. In many ways such community forests are a most helpful and constructive enterprise and are capable of becoming a decided asset financially as well as in other ways. The creation of such forests is being studied in several parts of the Tennessee Valley and the community forest idea is taking concrete form.

In many ways the use of forest and marginal lands for public hunting and fishing has proved to be of great social value. While such recreational use will in all probability be developed on all public forest land, the creation of public game preserves and public game lands under the administration of the several State game and fish authorities is coming more and more into the picture. With the splendid natural food and shelter facilities for forest and upland farm game and fur-bearing animals and with the great possibilities for fish and migratory wild fowl development offered by the lakes behind the power dams, foresters, sportsmen and conservationists are increasingly seeing the need for united cooperative effort in making the most of the wildlife in the Tennessee Valley.

The fact that a third of the forest area will probably remain in private hands in the form of farm woodlands calls for the establishment of good forest practice on such lands. Extension foresters in the states of the Valley have made a beginning but much remains to be done in this field.

This, briefly, is the situation of forests and forestry in the Tennessee Valley. While considerable advance in Federal forest and park development has been made or is in the making, there still remains a great area of forest land—about 13,350,000 acres, on which sustained forest management has yet to be established. At this point the Division of Forestry of the T. V. A. enters the picture. The Division has two distinct tasks. First, to take care of forestry and soil erosion matters on lands owned by the T. V. A., and second, to lend its aid in every way possible to all other agencies interested in the development of forestry and in the prevention of soil erosion in the Tennessee basin.

With these purposes in mind, the Division is directing the work of twenty-three Civilian Conservation Corps camps containing 4,600 men in reforestation, erosion control, forest stand improvement, forest (*Continuing on page* 500)

TREE CROPS FOR TENNESSEE VALLEY FARMS

By JOHN W. HERSHEY
Tree Crop Specialist, T. V. A.

Many Tennessee Valley farms include land too steep for cultivation whose fertility has been destroyed by erosion. These hills produce little except low grade timber and poor grazing, but if planted to crop trees may contribute food to the farm and hold the soil against washing.

"YOUR tree crops idea sounds good to me. There is one thing sure, the farmers of this county need something. Their land is washing away and their situation is becoming desperate."

This was the response of a county agent to whom I had just explained the purpose of the Tennessee Valley Authority to test the possibilities of tree crops in connection with Valley agriculture. His response was typical of the attitude expressed by most of the other county agents with whom I talked in the course of a survey of the Valley and I visited over one hundred. Many of these county agents told me they had been thinking along this line for a long time.

To them the idea was new and I naturally had to explain its meaning and why the Tennessee Valley Authority is exploring its application as one of many coordinated efforts to better living conditions in the rural sections of the Valley. The term "tree crops" relates not to forestry, orcharding, or farming directly but is used to define the culture of forests and pasture trees whose seeds and fruits are suitable as food for man or beast. They are usually our native forest trees and have fewer pests than introduced species but are propagated and improved under conditions that will yield maximum or select crops of food. Such trees as the walnuts, hickories and persimmons, for example, bear fruit in a forest setting, but individually they will produce heavier crops when grown under conditions that give them more sunlight and more room to develop their crowns than is the case in the forest. Furthermore, the quality of their fruit may be improved by scientific selection of native species and by the development of hybrid species.

The Tennessee Valley has long been recognized as an Eden of natural tree crops. The TVA, therefore, is undertaking to make the idea a practical economic reality by educating the Valley farmer to its possible place in his farm economy and in the regional development of native resources. In furtherance of this educational effort, it is planning tree crop demonstrational plantings on its own lands. A nursery devoted to trees locally adapted for tree crop purposes has already been established near Norris. Dissemination of improved crop trees from the nursery will be of immense value to the farmers. And here also will center investigations in the development of hybrid and improved crop trees.

What, it may be asked, is the application of the tree crop idea to the individual farm unit? As is well known, much of the agriculture in the Tennessee Valley is hill farming and much of the farm unit is wild land because it is too steep for cultivation or because its fertility has

been destroyed by erosion. These acres as a rule are producing nothing of value except low grade timber and a little grazing. Their productive value, it is believed, can be greatly increased by the proper selection and growing of crop trees which will contribute food to the farm and will at the same time permit diversification of crops, prevent soil erosion and reduce farm labor. There are lands on hundreds of farms in the Valley which are too good for forests but too steep for plow farming. Such lands are particularly adapted to the tree crop idea.

Our studies of the Valley indicate a great variety of promising species. There is the persimmon tree, for example, which grows throughout the region and yields a fruit suitable for marketing or for hog feed. There are early and late ripening varieties, graduating from common to highly flavored specimens, and those that may be dried like the fig. To my surprise a number of Japanese persimmons ten to fifteen years of age were found. They are proving hardy and are bearing well. One man east of Knoxville has several hundred of these Japanese persimmons, all topworked on natural seedlings. This is an interesting method of turning a weed tree to profitable use. The food value of the persimmon is comparable with tropical fruits like the fig and date. It is rich in vitamins and delicious either fresh or dry. The one big drawback is its astringent flavor but this disappears as the fruit ripens. Native trees are sometimes found, however, whose fruit has little of this quality, and by the process of proper tree selection this drawback can be overcome. Thus early and late bearing trees can be obtained to provide fruit for market and for stock feed from August into late winter.

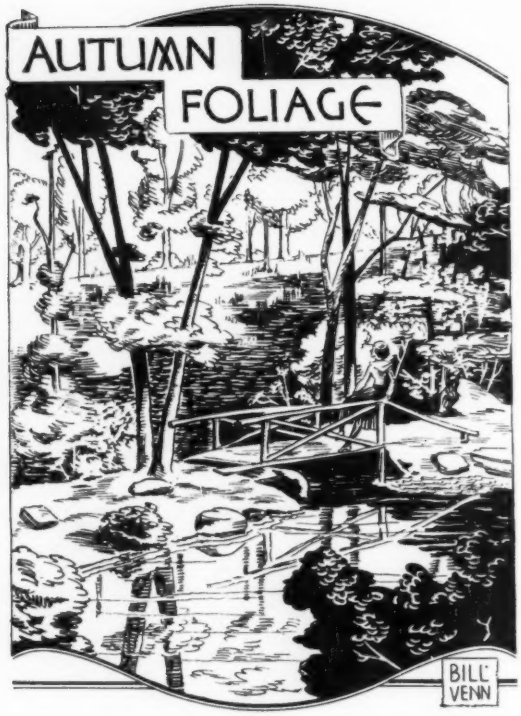
The common mulberry grows profusely and bears heavily in the Valley. Few people appreciate its worth as a source of food for hogs and poultry.

Throughout many of the Valley counties grows a much neglected tree commonly called the papaw. Its fruit is of varying size, but reports from the northeast section of Tennessee indicate this fruit attains a size eight inches long and as thick as a tumbler. It has an aromatic flavor which has led some people to call it the northern banana. Chickens and all manner of wild life relish it and some day there is reason to believe that large, highly-flavored papaws may find their place on city fruit markets. The commonplace mulberry grows as profusely and bears as heavily in the Tennessee Valley as the persimmon. It is so common, in fact, that few people appreciate its worth even for hog and poultry feed, but at least one turkey and chicken raiser is planting mulberries and persimmons for his flocks. Why haven't more done so? Mulberries have real food value and excellent flavor when fresh, but their real future lies in introducing superior varieties whose fruit can be dried and sold.

Many county agents complain because there are not enough walnuts. This magnificent American tree grows in the Valley wherever farming is not too intense. A county agent showed me a pint jar of meats which had been cracked out in a whole kernel—not halves, but the two halves intact. This was done when the nut was green and the kernel pliable, but the shell had to be thin and free of involutions in order to get the kernel out whole. The possibility of finding better walnuts than any we now have is promising. The nuts of improved varieties of black walnut crack out in quarters and halves and often bring a much higher price than nuts of common seedlings.

With erosion control so dominantly a part of all cultural operations in the Valley one may well consider the advantages of planting black walnut. A walnut planting of nearly two hundred and fifty trees which were set out on rolling land shows that walnut trees stimulate grass growth. This is important because so much of the present eroded land started slipping after the pasture had been too heavily grazed. One farmer who had become enthusiastic over his walnut trees asked me, "Why is it that this pasture has fattened my cattle better than the same acreage anywhere else on my farm either with other kinds of trees or without any trees?" He was convinced that nut trees are an excellent combination with pasture land.

Several species of hickories and pecans abound throughout the Valley. The nuts of many of the hickories crack open well and one Carolina shagbark hickory tree in Grainger County, Tennessee, produces nuts of higher merit than any hickory on record. Pecans also do well and already some excellent varieties have been developed. At three different places native wild hazels bearing nuts as large and as thin-shelled as the European filbert were reported. This is significant because the European filbert does not bear throughout the Tennessee Valley except in the (*Continuing on page* 502)



AUTUMN--
LEAF COLORS and WHY THE LEAVES FALL

By JOHN HARVEY FURBAY

Illustrated By William D. Vennard

AUTUMN is a restful season. For many of Nature's children, it is the peaceful repose between the surging activities of summer, and the dangers of winter. The season's work is finished or is near completion; babies have grown-up; the winter's food-supply has been prepared; and the next generation has been provided for. Now there is time to rest awhile.

A few animals may still be at work storing the last remnants of food, while others are taking long journeys to warmer climates. Still another group courageously bids farewell to this life when the first frosts come. There is no confusion or hesitancy. Every living thing knows exactly what to do. Whether it is to hibernate here, migrate to other lands, or face death—all are done with equal grace. Instinct is the master of their destiny, and it is unquestioned.

The color of the landscape is changing fast, but the greatest abundance of color usually comes in October. Touches of frost are now mellowing the wild grapes, and purple-mouthed boys evidence the popularity of this primitive food. Huckleberries, barberries, and wild apples are also ripe, along with the chestnuts. The berries become more conspicuous as the leaves fall.

Autumn flowers are abundant along roadsides and in open fields. They do not like the woods as well as spring flowers do. Goldenrod is queen of the fall flowers, and wild bergamot probably comes second. These two spread their yellow and blue colors in great profusion. Fall dandelions are abundant, and one may also find buttercups, violets, yarrow, and wild pansies.

Spider webs are being carried in the breezes, and may appear to cover whole fields. Hornet's nests are being deserted and the dead workers are found on the ground below the nests, while in the river bottom, Mr. Clam is shoving off for deeper water, leaving his furrow behind him in the sand.

Bird study is hard during this month. Many birds have their new winter plumage and look very different from usual. Male scarlet tanagers are now green; goldfinches are olive colored; and bobolinks look like overgrown sparrows (they are often called "reed-birds" at this time of the year). There appears to be an excess of females, but this is only because most of the young birds resemble females. Some days there are many birds, and on other days, only a few. There are seemingly "special days" for thrushes, flickers, bluebirds, ruffed grouse, and robins. Crows are flocking back and forth to and from their winter roosts, and many other birds may be seen heading southward.

When one returns from the woods or fields, he is likely to find many kinds of seeds clinging to his clothing. Beggars ticks and burrs, along with pricking Spanish needles make up the assortment.

Autumn colors are best in October, especially if frosts are late. A blaze of splendor surrounds us. Late in the month, the leaves fall faster and faster, leaving some of the trees bare. Then one may see dodder—that assassin of trees—with its many root-like tendrils driven into the trees, where it continues to suck the life-fluid. It is a complete parasite after it fastens itself to a plant.

Caterpillars are abundant on warm days, and many are spinning their cocoons. The woolly caterpillar does not spin now, but hides away in some crack over winter, and waits till spring to spin. Thus he may appear on warm days in mid-winter. Many other insects are still with us. Butterflies and wasps may be seen sipping the juice from tree wounds—their final "bacchanal," tomorrow they may die at the hand of Jack Frost, along with millions of their insect relatives.

The fall of the year has often been spoken of as "Nature's dress-parade." It seems that some master artist has come through on the wings of the wind and the mist of the dew, touching every leaf with a magic paint-brush, and leaving a trail of riotous beauty.

Painters who have mixed dyes for years and who have produced colors that have thrilled us, stand in awe and wonder at the hues which surround them as nature continues her vast art exhibit. In vain these experts try to duplicate the picture about them. They mix every color; they combine various colors; and they try to unlock the secret—but all in vain. The best they can do is only a poor imitation of what nature does. Inquiring into the process by which Nature works, we find in spring and summer the most outstanding color of the landscape is green. In the fall this green disappears and is replaced by various shades of orange, red, yellow and brown. In our northern states the vivid greens of the sugar maple, white oak, and sumac disappear as a blaze of red takes their place. This contrasts strongly with the yellow which appears in the hickory, linden, and poplar; the dark

green of the hemlock, spruce and pine; and the purple of blue ash.

The question of autumn colors can best be approached by inquiring into the composition of the pigments which color the leaves. There are three chief pigments in green leaves: green, yellow, and orange. The most abundant of these three is green (called chlorophyll), and it dominates the other colors so that as long as it is present in the growing leaf, the other colors do not ordinarily show, although they are there all the time.

This green pigment is produced only in the presence of sunlight. There are a number of conditions besides loss of light which cause the partial or complete disappearance of the green pigment. Low temperature, drought, injuries or diseases of various kinds will result in the loss of this pigment in leaves. When the green color disappears, the other colors (which were there all the time, but hidden) begin to appear. This is what happens in the fall.

This change of color can be produced at other times than in the fall. It can be produced by drought, disease, or low temperature. But the fall is the most common time for it to occur, for the temperatures normally drop, and the supply of water decreases. Hence, it is then that the green color usually disappears (except in evergreens) and the other color pigments are unmasked. Some trees lose this green more readily than others: the cottonwood tree may become yellow during a slight mid-summer drought, while a peach tree may still be green at the time the leaves are shed. In evergreens, the green pigment is less sensitive, and external conditions seem to produce little effect on it.

Our explanation thus far has shown how the yellow and orange colors appear. Now what produces red leaves? This color is not due to a pigment in the green leaf, but is due to a new color formed in the cell sap. This is the same color that is formed in beets, red cabbage, coleus, and in many flowers. These brilliant red colors of fall are probably not due to frost, as was once supposed, but seem to be produced when there is a mild autumn temperature accompanied by bright sunshine. In cloudy autumns, the leaves are likely to be a less brilliant red than in bright ones. It may be noted also that red usually predominates among vines fully exposed to the sunshine, such as woodbine and poison ivy.

White leaves are leaves without any color pigments of any kind. Their occurrence is not dependent on the season of the year.

The many and varied colors of the autumn season are thus produced by countless different combinations of these basic colors of yellow, orange, brown and red which appear after the green color has disappeared. These changes are produced, as we have shown, by changes in the weather, in moisture, and in sunlight. Nature's paintpot, then, is found in every green leaf, but the display of colors is usually saved for the autumn season.

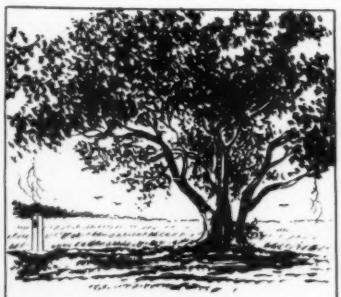
Have you ever wondered why leaves come tumbling off the trees in the fall of the year? No one has to pick them or pull them off the branches—they seem to cut themselves off. Only a short time before this, they were tightly attached to the twigs. What has happened to them?

Have you ever noticed that apples and many other fruits seem to be cut loose from the branches of the trees in the same way when they are fully ripe? Their stems seem suddenly to lose their hold on the twigs to which they have been attached. Have you ever noticed that nuts fall in the same way?

There must be some similar cause for the falling of leaves, fruits, and nuts when they reach a certain point of development. Observing (*Continuing on page* 499)

FAMOUS TREES EVERY BOY AND GIRL SHOULD KNOW

No. 18 - - - "THE LANIER OAK"



ON THE EDGE OF THE MARSHES OF GLYNN, AT BRUNSWICK, GEORGIA, STAND THE LANIER OAK AND A MONUMENT OF STONE WITH A BRONZE PLATE, MEMORIALS TO SIDNEY LANIER, NATIVE OF MACON, GEORGIA,—THE GREAT LYRICIST OF THE SOUTH

UNDER THE GRACIOUS BOUGHS OF THIS TREE, LANIER WAS INSPIRED TO WRITE ONE OF HIS BEST LOVED POEMS,—"THE MARSHES OF GLYNN." LANIER ENLISTED IN THE CONFEDERATE ARMY AND IN NOVEMBER, 1864, WHILE ON A BLOCKADE RUNNER WAS CAPTURED AND BECAME A PRISONER OF WAR FOR THREE MONTHS AT POINT LOOKOUT, MARYLAND. HERE HE CONTRACTED THE DISEASE WHICH RESULTED FATALLY FOR HIM

SIDNEY LANIER WAS A TALENTED MUSICIAN AS WELL AS ONE OF THE MOST NOTABLE OF AMERICAN POETS. HE WROTE A NOVEL, "TIGER LILIES," IN WHICH HIS WAR-TIME EXPERIENCES ARE OUTLINED. MOST OF HIS CAREER WAS PASSED IN BALTIMORE, AND IN GREENMOUNT,—A CELEBRATED CEMETERY THERE. HE WAS LAID TO REST AFTER HIS DEATH AT LYNN, NORTH CAROLINA, IN 1881—IN HIS FORTIETH YEAR.

AROUND THE STATES
WITH
THE AMERICAN FORESTRY ASSOCIATION

Shelterbelt Project Hits Snag

The shelterbelt project to gird the plains states with a hundred mile belt of trees in order that farmers may better cope with future droughts has come to grips with a drought on its own account. Funds with which to start the huge undertaking and to carry forward the work during the first year have not been forthcoming. Cause of the sudden drying-up of funds after announcement from the White House that President Roosevelt had allocated $15,000,000 under the Drought Relief Act has not been revealed by the Department of Agriculture. Upon inquiry, however, the Forest Service admits that there is a temporary hold-up and a cessation of action first started to set up an organization and begin work on the ground. An atmosphere of uncertainty has prevailed for the past several weeks. Fred W. Morrell, administrative director, and Raphael Zon, technical director of the project, were suddenly recalled to Washington late in August after they had taken the field to get the project under way.

From other sources it has been learned that the undertaking has been rendered more or less prostrate, temporarily at least, by a ruling by Comptroller McCarl that the expenditure of funds as contemplated by the shelterbelt project are not athorized by the Drought Relief Act passed by Congress June 19th last. This act made available $525,000,000 to provide immediate relief in the drought stricken states, and it was from this fund that President Roosevelt allocated $15,000,000 for initial financing of the shelterbelt work. The legal basis of the Comptroller's refusal to approve the expenditure is not definitely known but it is believed to be on the grounds that much of the expenditure of funds will not contribute to immediate relief and that completion of the project sometime in the future commits the Government to future expenditures not contemplated by the act.

On September 23, it was reported that the Comptroller had approved of an allocation of $1,000,000 to be spent in shelterbelt work in so far as it will contribute to immediate relief. With this amount, the Forest Service is proceeding with the preliminary work of seed collecting, preparation of needed nurseries and planting of seed for nursery stock.

McArdle Named Dean of Idaho Forest School

Dr. Richard E. McArdle has been named dean of the school of forestry at the University of Idaho to succeed the late Francis Garner Miller.

Dr. McArdle was formerly Chief Silviculturist at the Pacific Northwest Forest Experiment Station at Portland, Oregon. He graduated in forestry from the University of Michigan in 1923 and was granted his Doctor's Degree from the same university in 1930. Associated with the Northwest Forest Experiment Station since 1924, he assumed charge of forest fire research in 1930 and later became head of the section of forest management.

Dr. McArdle was born in Lexington, Kentucky, February 25, 1899, saw service in France during the World War, has traveled extensively in the forest regions of this country and is author of numerous technical articles and reports on forestry. His latest work describes a complete set of inexpensive instruments for estimating and forecasting fire danger. In the field of detection for fire control his notable contributions have been made possible through his ability to enlist the cooperation of physicists and other specialists.

Richard E. McArdle

South Carolina Develops Subsistence Fire Lookouts

Subsistence farming and the protection of forest lands from fire have been combined in the State of South Carolina as a means of providing fire protection to timberlands located in the thirteen coastal counties in the eastern section of the State. One-hundred-foot fire towers are being erected on small ten-acre tracts of land located at strategic points in the timbered areas along the coast. Under the program followed, the farms are turned over to men who agree to act as fire lookouts during the fire season in return for a nominal salary and the privilege of farming the small tracts of land.

The program calls for the completion of approximately fifty of the subsistence farm-fire towers. The work is being done by the men of the Civilian Conservation Corps under the supervision of the United States Forest Service and the State Forestry Commission. The necessary lands have been donated in most cases by land owners in the areas to be protected. The State Forestry Commission will hold title to the property.

"The State Forestry Commission solicited and secured without difficulty ten-acre tracts of land," State Forester Smith said in outlining the details of the new program. "These areas are being fitted up as small farms. The areas are fenced and some ten acres prepared for cultivation. A neat four-room house with a large front porch and screened back porch has been built or is being built on each tract for the towerman. Good water is being provided, as well as a barn and suitable outbuildings. Today, we can obtain mighty capable towermen for fifteen to twenty dollars a month in addition to a house and the privilege of farming the land.

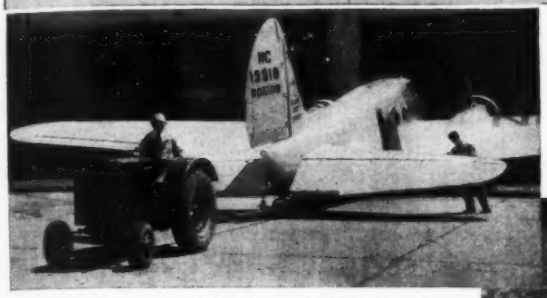
"Each towerman must be a dirt farmer with at least five years' farming experience. He must be married and have children. He must have a cow, a mule, pigs and chickens and necessary farm implements. All fertilizers produced on the place must be returned to the soil. He can raise only what he needs for his family and his stock. His 'cash crop' is the 100-foot fire tower which stands in the park area a short distance from his house and which will yield him from $180 to $240 a year."

Kaibab and Tusayan National Forests are Consolidated

President Roosevelt by executive order has consolidated the Kaibab and Tusayan National Forests, located in northern Arizona, into one unit to be administered from Williams, Arizona. The name of the enlarged unit will be the Kaibab National Forest. Supervisor Walter G. Mann of the old Kaibab unit, with offices formerly at Kanab, Utah, has been designated supervisor of the enlarged forest and has assumed administrative direction. Former supervisor G. W. Kimball of the Tusayan has been transferred to the district office at Albuquerque.

See What Others Are Doing with this Versatile Power

Backed by the **WORLD'S LARGEST TRACTOR BUILDER** *and a Country-wide Network of* **McCORMICK-DEERING SERVICE**

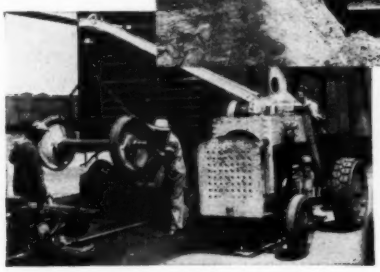


Above: The new McCormick-Deering Model I-12 industrial tractor, maneuvering a giant of the air at a municipal airport. This compact tractor offers speeds of from 2½ to 10¼ m. p. h., and ample power for airport, park, estate, and golf course (Fairway 12) requirements.

Above: The T-20 TracTracTor in a logging operation. The round hand-hole plates visible at the rear are a feature of TracTracTor accessibility.

Above: The Model I-12 industrial tractor hauling a train of lumber dollies. Here is efficient power for railroads, lumber yards, woodworking shops, etc.

Above: A leading brewery moves freight cars and performs many other tasks with this powerful Model I-30 industrial tractor.



Above: The McCormick-Deering Model T-40 TracTracTor at work on a dirt road job. This big crawler provides ideal power for road building and maintenance work, including snow removal.

At Left: A railway company uses this crane-equipped Model I-30 industrial tractor in maintenance work.

Above: A 25 h. p. power unit installation in the oil country. This efficient engine operates on natural gas and pumps three wells simultaneously.

Above: This T-40 TracTracTor and bull-dozer outfit helps to operate a strip coal mine profitably. Built with 6-cylinder gasoline engine and 4-cylinder Diesel engine.

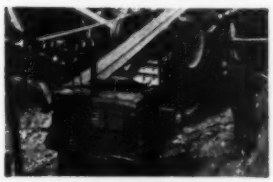
BUSINESS MEN are studying power costs today as never before. Burdens that had to be shouldered by industry in other days are being sidestepped with increasing frequency by men who have discovered this key to economy—*McCormick-Deering Power.*

Perhaps you have a power job that needs analyzing . . . that can be done better with *McCormick-Deering Power.* If so, the nearby McCormick-Deering distributor or International Harvester branch will be glad to consult with you.

McCormick-Deering Power is available in the form of power units, wheel tractors, crawler tractors, and modifications of these types.

Above: A 35 h. p. power unit operating a saw mill. Hundreds of outfits like this are at work, with good records to their credit.

Above: A McCormick-Deering-powered locomotive . . . an ideal unit for use in mine, quarry, clay pit, sand and gravel pit, etc.



Above: A 52 h. p. Diesel power unit operating a big gravel plant at remarkably low cost.

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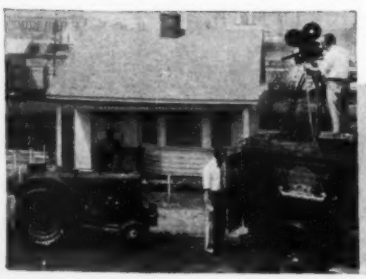

At Left: The radio-controlled tractor featured in the International Harvester exhibit at the World's Fair, Chicago, performing before the news-reel camera. The compact design and short-turning radius of the "12" series tractors are emphasized in this driverless demonstration.

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National Fish Policy Proposed

A national fish policy proposed and discussed by United States Commissioner of Fisheries, Frank T. Bell, at the meeting of the National Planning Council of Commercial and Game Fish Commissioners held in Montreal, Canada, on September 12 in connection with the meeting of the National Fisheries Code Authorities, would divide the country into five regional zones composed of states having common fisheries problems. Each zone would have an individual organization with a trained biologist and fish culturist responsible for coordinating the activities of the fisheries authorities of the states within the zone. The chairmen of the five zone committees would meet with the United States Commissioner of Fisheries at least twice a year, and annually with all state fisheries officials comprising the United States Planning Council.

In outlining the proposed national fish policy, Commissioner Bell urged a program to avoid duplication and overlapping of fish stocking efforts by the several states, prevent the intermingling and mixing of species, encourage a cooperative program for control of stream pollution, coordinate Federal and State activities for the control of soil erosion, for reforestation, for the development of stream surveys, for stream improvements and to promote the fullest cooperation with sportsmen.

New England Organizes Against Dutch Elm Disease

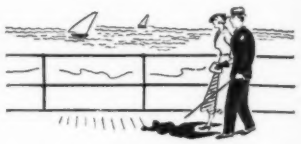
With appropriations for the control and eradication of Dutch elm disease from New York, New Jersey and Connecticut totalling $234,000 supplemented by $158,000 from the Federal Government, a total ot 6,824 diseased trees had been reported in the three states up to August 21 according to a statement by Dr. S. B. Fracker of the Bureau of Entomology and Plant Quarantine during a New England conference on Dutch elm disease held in Boston on August 31. The infected area, according to Dr. Fracker, covers between 3,000 and 4,000 square miles. Because of the inadequacy of the $30,000 appropriated by the New Jersey State Legislature for control of the disease, nearly 2,000 infected trees remain undestroyed, out of a total of 4,822 which have been reported. New York with an appropriation of $202,500 reports the discovery of 1,948 trees, of which all but 300 have been destroyed, and with $1,500 appropriated in Connecticut, forty-six of the fifty-four infected trees had been destroyed. Provision has been made to have the trees of these two States cut and burned before winter.

Dr. Fracker estimates that for every diseased tree that goes through the winter six new diseased trees will be found during the following season. While the European bark beetle which spreads the disease does not breed in healthy trees, it does feed on the bark and leaves of such trees and does more or less tunneling in them.

Dr. G. P. Clinton, of the Connecticut Agricultural Station, has been keeping closely in touch with the situation in that state and doubts the possibility of eradicating either the disease or the European bark borer from this country unless all diseased trees are taken out and destroyed before next spring.

Recognizing the Dutch elm disease as a national emergency calling for immediate destruction of all diseased trees the conference voted to create a New England Committee on Dutch Elm Disease and requested William P. Wharton to serve as Chairman and Harris A. Reynolds as Secretary.

TRACES OF SUMMER AND TIDINGS OF FALL FLAVOR THIS SEASON DOWN BY THE SEA



Once each year, and only once, there comes to the shore a season blended of late summer and autumn's first mellowness. Add to it the versatile hospitality of Chalfonte-Haddon Hall, and you have the ideal setting for an inspiring October holiday. • Here sport and amusements are still in their prime. Just outside our door, on the wide white beach, a faithful sun is waiting to turn your skin to healthy copper. The surf is the exact temperature for an invigorating plunge. Golf, horseback riding, tennis, sailing and countless other attractions are at their best. Or, if you like to be lazy, loll placidly on our broad Ocean Decks, letting time pass by on a tonic salt breeze. • Within the hotels health baths, game rooms, dances, entertainments and concerts invite you to amusement and repose. Even the food seems to possess more than its usual relish. • Come down soon for play or for rest. The two are always in perfect harmony at Chalfonte-Haddon Hall. Attractive rates. American and European Plans. Special weekly rates on application. Send for booklet.

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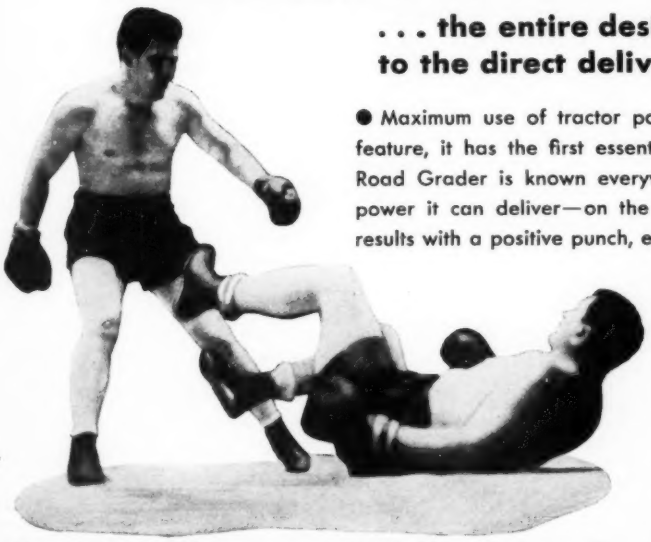

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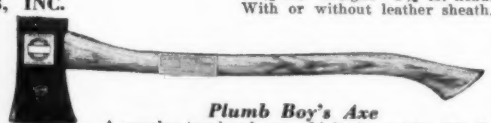

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Supervisor and Five C. C. C. Men Lose Lives in Western Fires

Unprecedented drought in the West during the past summer wrote a new record of forest fires for the Forest Service and took the lives of one forest supervisor and at least three Civilian Conservation Corps men. Critical situations were halted however by widespread rains during the second week of September.

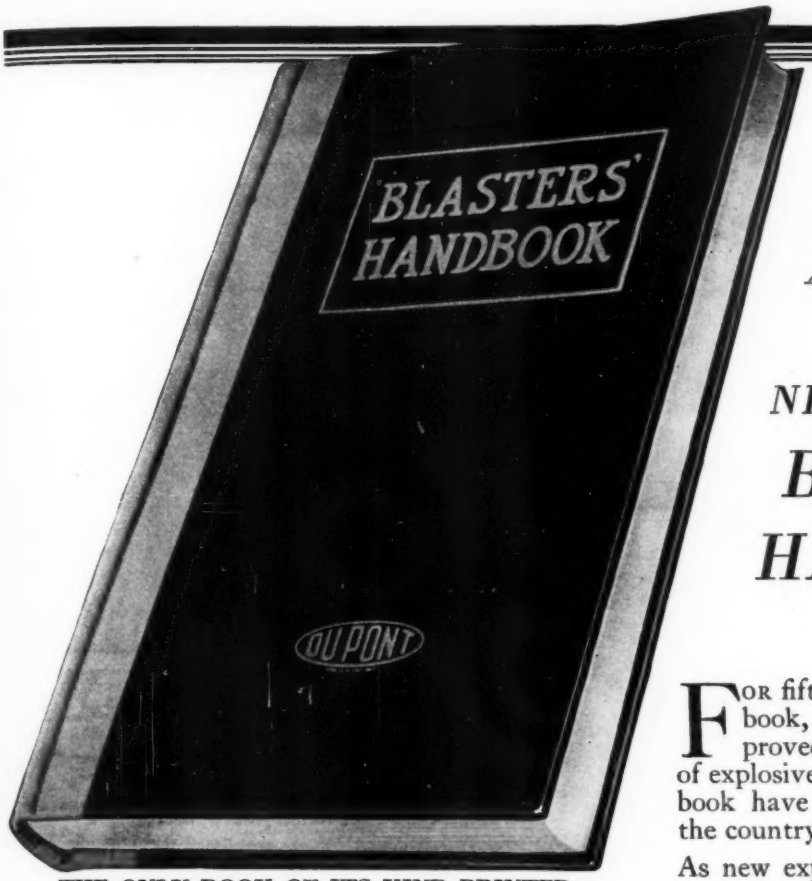
John S. Everitt, Supervisor of the Shasta National Forest in northern California, was caught by a sudden burst of flame when the wind rose unexpectedly during the evening of August 25 and perished in an isolated canyon. This was the first fire fatality among California's permanent force of foresters and took a young forest administrator whose promotions were won by effective work in many parts of that region. Supervisor Everitt was born in Pennsylvania, graduated from Cornell University in 1917, received the degree of Master of Forestry from the same school in 1920. He had been continuously with the United States Forest Service in California since graduating from college and had held positions on several National Forests of that state.

The five C.C.C. boys who lost their lives fighting fires in the West were Stanley J. Ferguson of Oswego, New York; Russell Eldridge of Holdredge, Nebraska; Lester Johnson of Galesburg, Illinois; LeRoy McGinnis of Ottawa, Illinois; and William Mattison of Los Angeles, California. Thousands of C.C.C. boys were called upon to help the regular Federal and State forces combat fire throughout the western mountains.

Hot, dry weather and lightning storms were largely responsible for the 9,338 fires which gives 1934 the record for the largest number of fires since the establishment of the National Forests. Fully half of these fires are reported to have been caused by carelessness with camp fires and smoking tobacco. Despite the greater number of fires the Forest Service reinforced by men from the C.C.C. camps and those employed with special emergency funds, working on hundreds of miles of fire lines and on thousands of isolated fires succeeded in holding the area burned to 500,383 acres as compared with 519,787 acres burned during the fire season of 1931. Preliminary estimates place the damage as of September 1 at $1,004,219 while over $3,000,000, including contributed services of C.C.C. men, were expended in efforts to control these fires.

Disastrous fires raged throughout Montana and the Pacific Coast where thousands of acres were blackened. Here portions of the primitive area of the Flathead National Forest where the Trail Riders of The American Forestry Association camped in July were reported in flames during August. Fires on the Selway National Forest in Idaho covered nearly 200,000 acres and were not under control until drenched by heavy rains in September. It is estimated that at one time 4,000 men were fighting the Selway fires. Two of the worst fires were the Pete King fire which burned almost 100,000 acres and the McLendon Butte fire of over 75,000 acres.

Over 1600 fires were reported in Arizona and New Mexico, but the forest officers held them down to a little more than 25,000 acres, but in Utah, southern Idaho, western Wyoming, and Nevada extreme dry weather and hot winds resulted in over 90,000 acres being burned, with destruction of timber and forage valued at more than $325,000.



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President Approves New Duck Hunting Provision

President Roosevelt on August 20 approved the thirty-day hunting provision for wild ducks and other migratory waterfowl. Along with this amendment to the regulations governing migratory game birds throughout the United States the President approved other changes recommended by Secretary Wallace and the Advisory Board, Migratory Bird Treaty Act. The effect of these amendments will be not only to cut in half the number of days on which sportsmen may hunt ducks but to limit certain conditions under which hunting may be conducted.

The shooting of waterfowl on baited premises, for example, may be done only under permit while the baiting of mourning doves has been prohibited altogether. The permits must be obtained from the Biological Survey. They will be issued without charge and are revokable by the Secretary of Agriculture. They will be issued, however, only upon condition that migratory waterfowl on baited premises will not be shot after 3:00 P. M., nor while resting on water or land, nor in violation of State law or regulations.

Hunting previously permitted during the half hour before sunrise has been made illegal, but the former restriction on shooting before noon on the opening day of the season has been lifted. Because of the specially critical status of certain species of ducks the daily bag limits on these birds are reduced from eight to five and possession limits from sixteen to ten. The birds affected by this amendment are the canvasback, eider duck, greater scaup, lesser scaup, ring-necked, blue-winged teal, green-winged teal, cinnamon teal, shoveller, and gadwall.

In addition to familiarizing themselves with the new hunting regulations, sportsmen who hunt migratory waterfowl are required to provide themselves with a Federal hunting stamp, in accordance with a recent Act of Congress requiring migratory waterfowl hunters over sixteen years of age to procure a Federal hunting license. These stamps are sold at $1.00 each at all post offices in towns of 2,500 population and over, in county seats and in certain other localities. The receipts from the sale of these licenses will be used by the government to create waterfowl refuges.

Although duck hunters will have fewer days of shooting under the amended regulation, the hunting season will be extended by virtue of the fact that the different States are permitted to designate the days on which duck hunting will be permitted.

The new open seasons prescribed for waterfowl, Wilson's snipe or jacksnipe and coot are as follows:

California has chosen a season of 22 days, consisting of Saturdays and Sundays during 11 weeks beginning October 20 and ending December 30, and New Mexico will have a 28-day season, providing shooting on Saturdays and Sundays for 14 weeks, October 13 to January 13.

All other States have elected 30-day seasons.

Two States will have continuous seasons—Nebraska, October 16 to November 14, and West Virginia, November 1 to 30.

Hunters in 9 States will shoot 5 days a week for 6 weeks—Michigan, Wisconsin, Minnesota, North Dakota, and Wyoming, Wednesday to Sunday, October 3 to November 11; Iowa, Wednesday to Sunday, October 10 to November 18; and Arkansas and Mississippi, Tuesday to Saturday, November 6 to December 15.

In Florida, the only State choosing a 4-day-a-week season, shooting will be permitted Thursday to Sunday during 7 weeks beginning November 22 and ending January 6 and on the succeeding Thursday and Friday, January 10 and 11.

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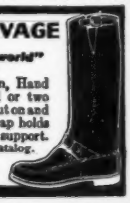

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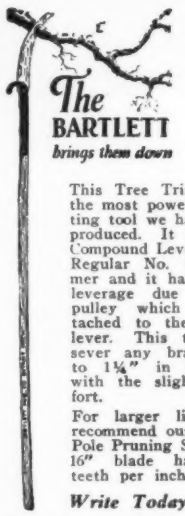

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In three States—Arizona, Idaho, and Illinois—the hunting days will be Saturdays, and Sundays during 15 weeks beginning October 6 and ending January 13, and in two States—Colorado and Nevada—the two opening days will be Monday and Tuesday, October 1 and 2, and the season will continue on Saturdays and Sundays for fourteen weeks, October 6 to January 6.

Budget Hearing Under Way

Budget hearings for the several Bureaus of the Department of Agriculture began in September and will continue into October. Following the resignation of Lewis Douglas as announced on September 2, the President appointed Daniel W. Bell of the Treasury Department to serve as Acting Director of the Bureau of the Budget. Due to Mr. Bell's regular duties in the Treasury, from which he has not been relieved, responsibility for Budget hearings may fall largely upon his assistants. Colonel Charles L. Dasher has direct charge of the Department of Agriculture budget.

Receipts From National Forests Show Increase

A twenty-five per cent increase is shown in the income from the National Forests for the fiscal year ending June 30, 1934. Total receipts from timber sales, water power leases, grazing permits and other commercial uses of the forest total for the year $3,314,691, an increase over 1933 of $688,642. The most marked increase in National Forest business was shown in the sale of timber and permits for waterpower purposes. Receipts from both activities were double those of 1933. These gains, however, were somewhat offset by a falling off in grazing fees due to emergency droughts and other unfavorable conditions in the livestock ranges which made it necessary for the Government to lower its grazing fees temporarily. Total receipts from grazing were $100,000 less in 1934 than in 1933.

The states in which the National Forests are located will be part beneficiaries in the $3,315,000 National Forest business of last year, since under the law twenty-five per cent of the receipts are turned over to the states to be pro-rated to the counties for road and school purposes. An additional ten per cent must go for forest road building in the counties in which the forests are located.

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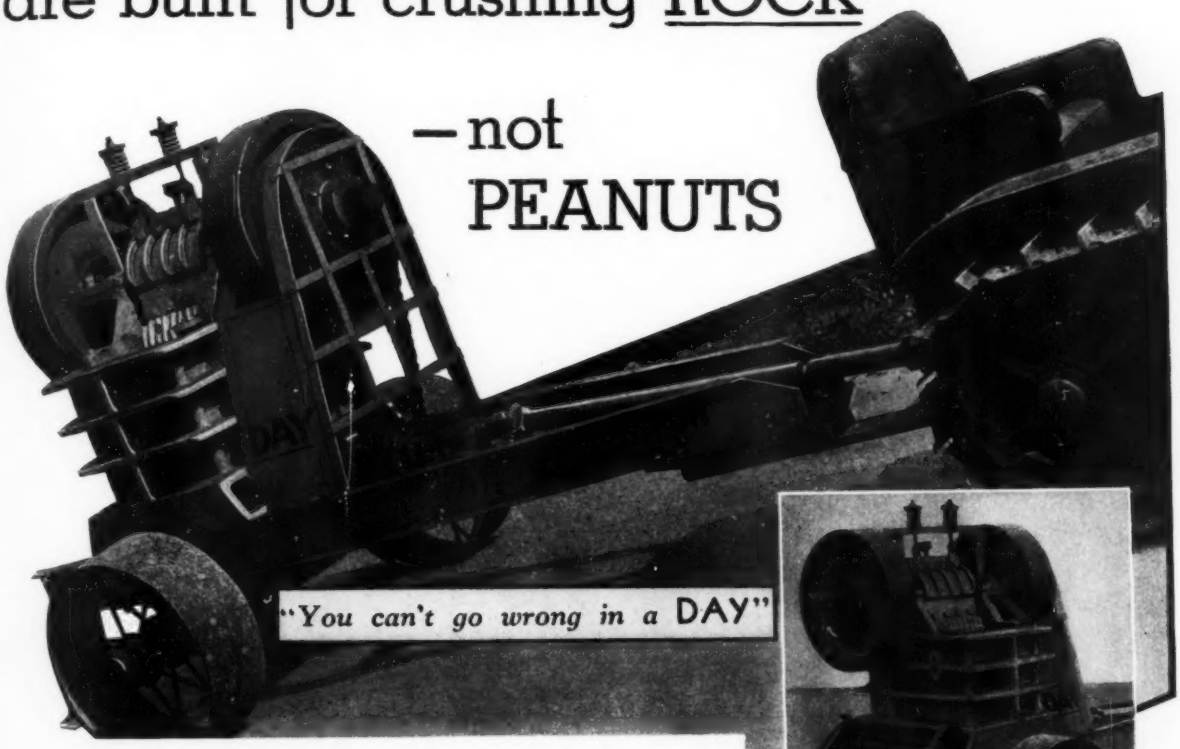

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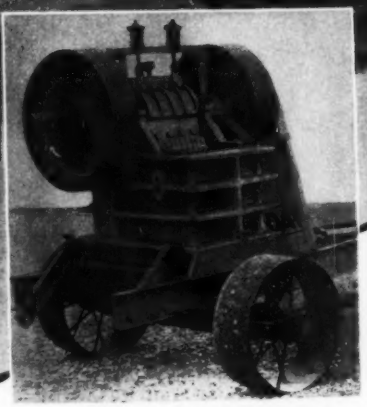

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Book Reviews

WATER GARDENS AND GOLDFISH, by Robert V. Sawyer and Edwin H. Perkins. Published by A. T. De La Mare Company, Toronto, 1934. Illustrated. 255 pages. Price $2.00.

Dealing with two closely related subjects, this book will prove a valuable aid for the amateur as well as the artist in beautifying his property with water gardens. No matter whether one is interested in growing a few lilies in a pan on his porch or whether he seeks information regarding the commercial possibilities in this field, the book will be a source of inspiration to him.

Part I, by Mr. Sawyer, is devoted to water gardens and abounds in pictorial reproductions of actual water lily pools located in various parts of the country. Part II, by Mr. Perkins, deals with the breeding, feeding, and general care of goldfish, with descriptions of various types that can be enjoyed in pool or aquarium. Many excellent photographs of individual goldfish specimens appear throughout the text, as well as numerous reproductions of the author's own drawings.—M. C.

IDENTIFICATION OF THE TIMBERS OF TEMPERATE NORTH AMERICA, by Samuel J. Record. Published by John Wiley & Sons, Inc., New York City. 196 pages, with numerous halftone plates and line drawings. Price $3.00.

With the earlier volume, "Identification of the Economic Woods of the United States" out of print, Professor Record has rewritten and expanded the subject in this new volume, "Identification of the Timbers of Temperate North America."

In part I a comprehensive description of the anatomy and physical properties of wood is presented. This technical subject is presented clearly and is well illustrated with drawings and photomicrographs. An adequate understanding of the first part is essential to the use of the descriptive key which constitutes the major portion of Part I. Supplementing the key, which is for the single purpose of identifying woods, are brief descriptions of the principal timber trees of North America with references to more complete descriptions. Knitting the entire book together is a comprehensive index.—G. H. C.

THE AMERICAN CIVIC ANNUAL, Volume V, edited by Harlean James. 278 pages with illustrations. Published by the American Civic Association, Inc., Washington, D. C. Price $2.00.

A compilation of brief authoritative articles by a group of nationally recognized planners and administrators of Federal, State, municipal and private properties. The articles comprise a veritable encyclopedia of planning information. Grouped under such headings as The Nation, are separate statements dealing with land planning in general and as applied to National Parks, National Forests, the Federal City and Housing. Other divisions such as regional planning, planning in the states and in cities and towns are also subdivided to bring out the more salient features of recent trends.—G. H. C.

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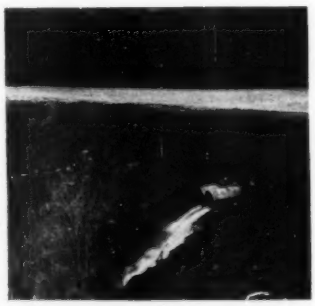

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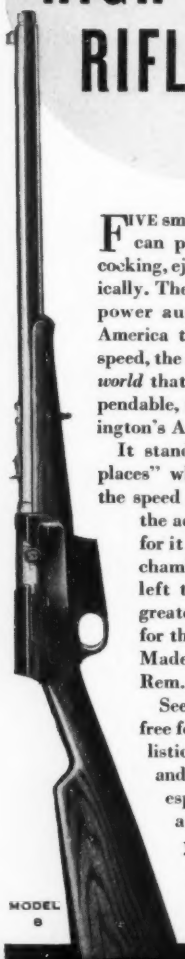

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FECHNER TO RECOMMEND CONTINUATION OF C. C. C.

Returning early in August from a two months inspection trip of C.C.C. camps, Robert Fechner, Director of Emergency Conservation Work, expressed himself as highly gratified and enthused with the work and conduct of the Corps. During his trip he visited camps in a large part of the West and as a result of what he saw of actual camp life and work he stated that he is thoroughly convinced the Corps has justified itself from every angle both in the effect it has had on the boys and as a relief measure.

Asked if the newspaper reports to the effect that he would recommend the Corps be made permanent were correct, Mr. Fechner said that while he had not been quoted entirely correctly he does intend to recommend to the President that the Corps be continued on a permanent basis. "I do not intend to suggest a detailed plan," he said. "If the President or a Congressional Committee ask me to submit my views as to the form the organization should take, if made permanent, I would be glad to do it, but would not offer them unless asked."

Mr. Fechner said that during his entire trip of two months he did not hear any adverse criticism of the camps, although he contacted many business and other people in local towns and cities. "Everybody was enthusiastic about the Corps," he said. "They told me that the camps in their locality had proven to be a benefit financially to the business people and that the work accomplished had met with approval." Referring to the fact that during the first year of the Corps there had been some local complaints against the boys, Mr. Fechner said that that had disappeared almost entirely this second year and that the boys are being welcomed and received quite generally in local activities. He said he was greatly impressed by the amount of work the boys are accomplishing in the National Forests and Parks. In the course of his trip only two complaints that politics was embarrassing camp administration were brought to his attention and both were promptly corrected.

The fourth six-month period of the Corps begins October 1. Mr. Fechner stated that the Army estimates that from ninety to one hundred thousand boys will have to be replaced due to expiration of prescribed periods and natural retirements. He said that within the past few months an average of about ten thousand boys a month have been leaving the camps to take jobs. In explanation of this he said that business men with whom he talked told him that they preferred boys who have had the work and training given by the C.C.C. camps.

CARPENTER APPOINTED DIRECTOR OF GRAZING

Ferrington R. Carpenter of Hayden, Colorado, was appointed Director of Grazing in the Department of the Interior on September 11, and entered immediately upon his new duties. As administrator of the Taylor Grazing Act of June 28, 1934, he will develop a staff, take charge of the public land grazing districts, and assume other duties authorized in the Act.

Mr. Carpenter is owner of a large herd of pure bred Hereford cattle in Colorado and a member of the Executive Council of the American National Livestock Association. Born in Evanston, Illinois, August 10, 1886, he graduated from Princeton in 1909 and three years later from Harvard Law School. He was vice-president of the Colorado State Bar Association, helped prepare the N.R.A. Code for the cattle industry, and was active in securing the processing tax on beef.

Preparatory to establishing under the new Grazing Act public grazing districts comprising nearly 11,000,000 acres, Assistant Secretary Oscar Chapman of the Department of the Interior is holding seven hearings in widely separated Western cities during September and October. The first hearing was scheduled for Grand Junction, Colorado, on September 17 where he was joined by Director Carpenter. The meeting was called to consider the establishment of grazing districts in that region of over 1,300,000 acres which local range users have requested be placed under grazing administration. This area is within the Congressional district of Representative Edward T. Taylor, sponsor of the Grazing Act, which authorizes the government to place under grazing control 80,000,000 acres of unappropriated, unreserved Public Domain.

Following the meeting at Grand Junction other hearings will be held at Bakersfield, California, October 1; Alturas, California, October 5; Klamath Falls, Oregon, October 11; Burns, Oregon, October 16; Salt Lake City, Utah, October 22; and Alamogordo, New Mexico, October 31. Assistant Secretary Chapman returned in August after a series of conferences held at different points in the West looking to plans for the establishment of grazing districts and the form of administration to be carried out. The Assistant Secretary was not prepared to indicate the probable fees that the Department will charge, except to say that they will be nominal and that every effort will be made to work out grazing rules and regulations that will be in harmony with those already established by the Forest Service. To this end the Department of the Interior expects to invite a representative of the Forest Service to work with the Department's committee now engaged in studying the grazing problem of the Public Domain.

TAX REVERTED LANDS LOOM LARGE IN SOUTH

Some twenty million acres, of which over twelve million acres are forest land, are in the tax reverted class in the southern states of Florida, Arizona, Mississippi, Louisiana, Arkansas, Oklahoma and Texas, according to E. L. Demmon, Director of the Southern Forest Experiment Station at New Orleans, Louisiana. In cooperation with the states the station is making a survey of tax delinquent forest land and practical measures for dealing with the situation.

Information already gathered indicates that sixty per cent of the land sold for taxes in eight southern states since 1926 is forest land valued on the assessor's book at more than $50,000,000. Taking these lands from the tax rolls has transferred the burden of taxation to other property. In many regions tax delinquency continues to increase. "The problem of tax delinquency has reached alarming proportions in several gulf states," declares Ronald B. Craig, assistant forest economist of the station, "and unless solved by aggressive action on the part of public officials, taxpayers and interested agencies, it will threaten the economic stability not only of the lumber industry, farming and manufacturing, but of local government itself." Florida with 11,800,000 and Louisiana with 2,708,000 acres lead the southern states in tax reverted area.

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SAPLING SAM RETURNS

Wrong Kind

The small boy is disconcerted upon learning that President Roosevelt has put men to planting birch trees.

From the San Antonio Express.

Wife—I'm afraid the mountain air would disagree with me.

Hubby—My dear, it wouldn't dare.

—Wood Construction.

Dumb Nature

A Colorado miner who was driving an efficiency expert over the mountains one cold and snowy day, spread the buffalo lap robe over his knees.

"You ought to turn the hair side on the inside," said the efficiency expert. "Don't you know it's a great deal warmer to have the hair next to one's body?"

The old miner obeyed and then began to chuckle. "What are you laughing at?" asked the passenger. "Are you laughing at me?"

"No," replied the miner. "I was thinking about the buffalo. What a fool he was all his life not to know a simple thing like that."

—Boston Transcript.

Here's Your Hat, What's Your Hurry?

Departing Guest—"You've got a pretty place here, Frank, but it looks a bit bare yet."

Host—"Oh, it's because the trees are rather young. I hope they'll have grown to a good size before you come again."

—Tid-Bits.

Song of the Open Road

I think that I shall never see
A billboard lovely as a tree.
Perhaps, unless the billboards fall,
I'll never see a tree at all.

—Ogden Nash, in The New Yorker.

Range Examiner: "You will notice that the insects have defoliated the brush."

Stockman: "Yeh! And they've eaten all the leaves, too."—*Daily Letter.*

Discouraging Job

"Our duties, madam," said the forest ranger to the city tourist, "is to watch for forest fires."

"And I suppose you find a great many."

"No, just a few each season."

"Mercy! I should think you'd get terribly discouraged."—*Service Letter.*

Give 'Em Time

Lady Jane—"Have you given the goldfish fresh water, Janet?"

Janet—"No, mum, they didn't drink all the water I gave them yesterday."

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Land and Water Resources Report

Reports on land and water resources of the United States are being prepared by all of the Government Bureaus, including the Forest Service, Park Service, Indian Service, Erosion Control Service and Biological Survey, for the National Resources Board preparatory to their coordination and transmittal to the President on December 1, in accordance with an Executive order signed on June 30, 1934.

The land report is being prepared under supervision of Dr. L. C. Gray in the Agricultural Adjustment Administration with a staff in Washington working with a field staff of forty-eight land planning consultants who collaborate with the State Planning Boards. The Land Planning Committee organized to advise with Dr. Gray consists of Assistant Secretary of the Interior Oscar Chapman, Dr. Mordecai Ezekiel of the Agricultural Administration, Arno B. Cammerer, Director, National Park Service, and Jacob Baker of the Federal Surplus Relief Administration. The report is being rushed so that the National Resources Board may have the month of November in which to prepare it for transmittal to the President on December 1.

Morris L. Cooke, Chairman of the Water Section of the Board, expects to have the report on the Mississippi Basin ready for submission by October 1 and on the water resources of the entire United States by November 15. The report, "A Plan for the Mississippi Valley," represents six months' work of the Mississippi Valley Committee of the Public Works Administration, which has been transferred to the National Resources Board and reorganized as the Water Section. The Water Planning Committee includes Harlan H. Barrows, Herbert S. Crocker, Lt. Col. G. E. Edgerton, Henry S. Graves, Charles H. Paul, Sherman M. Woodward and Dr. Harlow S. Person.

The National Resources Board consists of the Secretary of the Interior, Chairman, with the Secretaries of War, Agriculture, Commerce, and Labor; the Administrator of Emergency Relief; Frederick A. Delano, Charles E. Merriam and Wesley C. Mitchell. The last three constitute the Advisory Committee of the Board. Other reports dealing with minerals, power, transportation and industrial resources will be prepared later.

Karl F. Kellerman Dies

Karl F. Kellerman, who as chief of the division of plant disease eradication of the United States Department of Agriculture's Bureau of Entomology and Plant Quarantine had direct charge of controlling white pine blister rust and Dutch elm disease, died after a brief illness in Washington, D. C., on August 30.

Dr. Kellerman was born of American parents in Gottingen, Germany, in 1879, graduated from Cornell University in 1900, and received the degree of Doctor of Science from Kansas Agricultural College in 1923. His work in botany, plant physiology, soil bacteriology, and water and sewage treatment was widely recognized. From 1901 until the past year he was with the Bureau of Plant Industry of the United States Department of Agriculture, and served as Associate Chief of the Bureau with Dr. William A. Taylor from 1917 until 1934. With the reorganization of the Bureau of Entomology and Plant Quarantine he was given charge of the division of plant disease eradication.

Dr. Stanley B. Fracker will take charge of white pine blister rust work, while L. H. Worthley will assume responsibility for control of Dutch elm disease.

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QUESTION: Under what legal authority can the Forest Service, or another bureau be transferred from one executive department to another?—G. A. C., California.

ANSWER: This can be done by special Act of Congress, but during the emergency declared in the Act of March 3, 1933, the President has power after investigation to regroup, consolidate, transfer or abolish the whole or any part of any executive agency by Executive order. Such an Executive order must be submitted to Congress while in session and shall become effective after sixty calendar days, unless Congress shall provide an earlier effective date. Power to make such Executive orders continues for two years or until March 20, 1935.

The original act authorizing this Executive power was approved on March 3, 1933, but amendments were enacted by the Seventy-third Congress on March 20, 1933.

QUESTION: Is there a State Park near Virginia Beach, Virginia, and are there any forests in the vicinity of Virginia Beach and if so what use is made of them?—B. C. H., Washington, D. C.

ANSWER: The Seaside State Park including 1,060 acres is about five miles from Virginia Beach. There are good forests, mostly loblolly pine, within a few miles of Virginia Beach. These are privately owned and constitute an important feature in the lumber production of eastern Virginia.

QUESTION: What is submarginal land?—F. W. B., Maryland.

ANSWER: Submarginal land may be defined as crop or pasture land which over a long period of time and even under reasonably efficient management cannot yield an income sufficient to support the operators in what is considered a satisfactory standard of living. Frequently, land which is submarginal for one purpose may be supermarginal or highly profitable for another purpose.

QUESTION: What is the one-fifth rule for figuring the contents of a tree?—E. N. W., West Virginia.

ANSWER: The one-fifth rule is described by H. H. Chapman in "Forest Mensuration" as the "fifth girth," according to the following formula $V = \frac{(G)^2}{5} \times 2H$. In other words, divide the girth in inches by five and square, then multiply by twice the merchantable height in feet.

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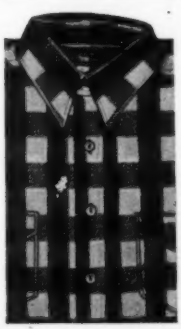

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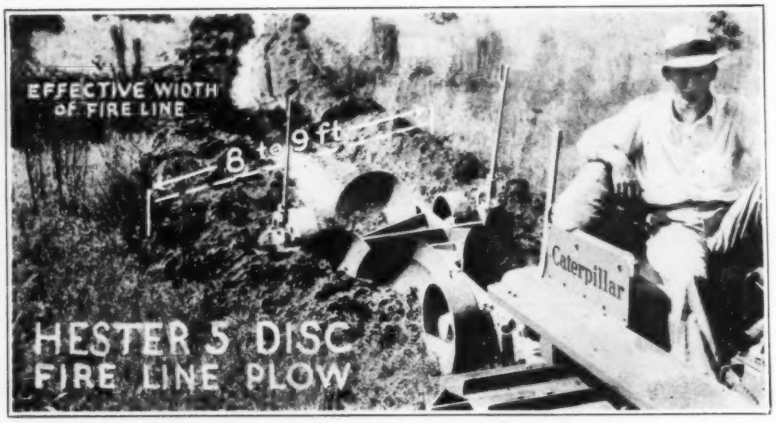

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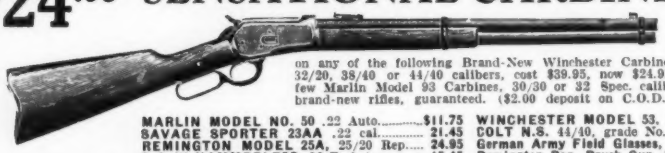

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Lumber Consumption Shows Heavy Ebb

The Forest Service's latest biennial study of lumber distribution and consumption, just completed with the cooperation of the U. S. Census Bureau and the Dominion Bureau of Statistics of Canada, showed an apparent U. S. consumption of lumber for 1932 totalling 11,677,624 M feet, board measure. This compares with a total consumption of 23,342,708 M feet for 1930 and of 35,380,901 M feet for 1928. Of the total lumber consumption in 1932, softwoods accounted for more than 9 billion feet, and hardwoods for a little less than 2 billion. Per capita consumption in 1932 dropped to 94 board feet, as compared with 190 feet in 1930 and 295 in 1928.

The estimated consumption of lumber in the United States in 1932 decreased to a new low point unprecedented since 1869, the Forest Service comments but expresses the view that this low point marked the bottom of the depression curve in the lumber industry, as the preliminary figures for 1933 show an increase in production of approximately 30 per cent over 1932.

The Forest Service analysis showed that 30 States had to depend on outside sources for the greater part of their lumber. Many of these States, however, have considerable areas of forest lands capable of producing a larger share of the local timber requirements under an adequate program for rehabilitation and protection of the areas.

California showed the largest total consumption, 1,457,010 M board feet, followed by New York with 1,047,748 M feet. Highest per capita consumption rates were in Oregon and Washington, with 549 and 477 feet of lumber per capita consumed, respectively. Total imports of lumber from foreign countries to the United States in 1932 amounted to 391,913 M board feet, of which 341,495 M feet came from Canada. The United States exported a total of 1,197,283 M board feet during the year. Of the exports, 955,484 M feet were softwoods and 241,799 M feet were hardwoods.

Fire Study Upsets Common Belief

The widely accepted belief that repeated ground fires so prevalent in the longleaf pine woods of the South exhaust the fertility of the soil is not borne out by studies recently conducted by the Southern Forest Experiment Station of the United States Forest Service. The findings of the Station thus far at least indicate an increase in soil organic matter in forest soils which have been subject to burns over unburned soils. The results of this enlightening study are given in a bulletin published by the Agricultural Experiment Station of the University of Florida, entitled "Effect of Frequent Fires on Chemical Composition of Forest Soils in the Longleaf Pine Region." The authors of the bulletin are Frank Heyward of the Southern Forest Experiment Station and R. M. Barnette of the Florida Agricultural Experiment Station.

In commenting on the study the authors state:

"No evidence was obtained indicating that fires deplete soil nitrogen or organic matter; on the contrary, an indication was found that fires actually result in an increase in soil organic matter. Likewise, strong evidence was found that an increase of total nitrogen follows repeated fires. However, the differences both in organic matter and in nitrogen were small. For replaceable calcium the differences, on a percentage basis, were much larger than for nitrogen and organic matter, as much as 101 per cent more being found on the burned areas. For the eight areas sampled in detail

replaceable calcium averaged thirty-six per cent more on the burned portions.

"Although the differences found during this study are very small in absolute units, the data indicate that in relation to the total quantities or the individual materials present in the soil, these differences may be relatively large. Furthermore, the importance to plant growth of even small quantities of nutrients is well recognized by physiologists.

"Since the higher replaceable calcium content of the soils of burned areas may be attributed to the addition of ash following fire, it is probable that the quantities of potassium, magnesium, phosphorus and other constituents of ash are likewise somewhat increased by fire. * * * *

"The observed changes in chemical composition of the soils, ascribable to fire, were restricted to the top four to six inches.

"Unburned areas studied were characterized by a layer of pine needle litter from two to three inches deep. Except in openings in the stands of pine, only a scant ground cover was present. On the frequently burned areas only a small quantity of litter was present, but a ground cover, consisting of wiregrass and a wide variety of broadleaved herbaceous plants, including numerous members of the *Leguminosae*, was typical.

"Differences found in nitrogen and organic matter are believed to be due to differences in the forest floor and in ground cover as a result of burning. Changes in acidity and in replaceable calcium can be attributed to the addition of ash following fire."

The study was made in connection with more comprehensive investigations now underway by the Southern Forest Experiment Station into the effects of fire upon forest growth.

Blister Rust Control Extended In Washington and Idaho

An allotment of $30,000 of F.E.R.A. funds by Governor Martin of Washington permitted a month's additional employment of over seven hundred men in white pine blister rust camps on National Forests and privately owned forest property in Spokane, Pend Oreille and Stevens Counties, while a smaller amount from Idaho funds permitted the continuation of work in eleven camps employing nearly four hundred men in the Kaniksu and Coeur d'Alene National Forests. Dangerous forest fires throughout this region have taken the services of many of these men temporarily away from blister rust control.

Blister rust authorities announce that by the end of this season wild currant and gooseberry bushes on over 1,500,000 acres of western white pine lands will have been destroyed by trained crews of local and C.C.C. men.

North Cascade Primitive Area Created in Washington

The "North Cascade Primitive Area" of the Mt. Baker National Forest extending southward into the State of Washington for twenty-one miles from the Canadian border and including the snow-capped Mt. Baker and Mt. Susksan has been recently set aside by the Forest Service. This area of 803,000 acres includes two previously established recreation areas, and is larger than the State of Rhode Island. Within its boundaries are numbers of wild game such as grizzly bear, mountain sheep and goats, black-tailed deer, cougar, bob cats, coyotes and black bear. It is too rugged for human habitation but heavily timbered and will remain primitive under the present policy of the Federal Government.

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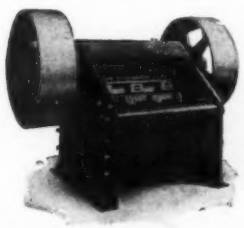

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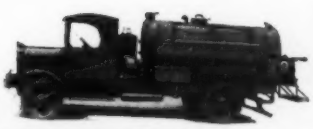

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And CEDRIC H. GUISE
Assistant Professor of Forest Management at Cornell University

THE primary purpose of this book is to aid in strengthening the system of forest education in the United States. To this end the authors point out the elements of strength and weakness in the forest schools and suggest measures that would lead to raising the general standard of professional preparation in forestry. The book should prove of service to those connected with forest schools, to teachers in colleges and universities which conduct non-professional courses and research in the field of forestry, to students and prospective students of forestry, to employers of foresters, forest owners, men engaged in forest industries, and to laymen interested in the many phases of conservation relating to forestry.

The study was initiated in 1926 as part of a program undertaken by the National Academy of Sciences to investigate the methods of research in forestry. It was carried forward under the auspices of the Society of American Foresters through a grant made by the Carnegie Corporation.

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MOUNTAIN ARIEL

(*Continued from page 454*)

slid away down the slope. But one cannot have wild honey, it seems, without also slaughtering some bees.

Down the slope there was shouting and merriment. The angered bees had to be met with smoke as they emerged and sometimes the victory was not always to the attackers. Ben and his father darted agilely about, but always their maneuvers brought them closer to the fallen trunk and at last they called to us that it was safe to approach. Down we hastened in a group, but I soon discovered that the safety was relative, dependent altogether on one's ability to dodge. Single bees still flew furiously about, but as a swarm they had been broken and scattered and it was possible to beat the stragglers off.

Bill took up his ax again and mounted the trunk. With a single swing he brought the shining edge down on the wood, about a foot above the knot-hole. Like a miracle the blade seemed to stop the instant it touched the bark, making only the lightest contact. He repeated the maneuver, striking below the knot-hole and again to one side. Then, with a deft twist, he flipped off a huge piece of bark and lo—the hoard lay exposed.

It was not the mass of golden pores that one had come to expect, from one's inevitable imaginings, but it was a sight, nevertheless. Dark, almost black comb filled the space, not solidly and evenly, but in irregular pieces, often left with large holes through them. Much of the comb was empty. "Bee bread" was mixed through it. Bees, sad and feeble looking, crawled up and down over it. It was a mine, a factory, a storehouse—what you will. Some of the honeyed sections were broken and dripping from the fall.

"Three years work," I thought queerly, and then the bee hunters capable hands crossed my view, lifting out piece after piece, sorting empty comb from filled, brushing off stray bees, slowly but surely emptying the hole.

I sat with Mrs. Coe on a fallen log a discreet distance away and there presently the children brought us large dripping pieces which we ate with a feeling of refreshing innocence and pleasure. Say what you will, I found the flavor of that despised dark sweet honey infinitely superior to that of the pale work of the cultivated bee. It is richer, it has a positive taste as well as a mere sweetness, it is more plentiful in the comb, the comb itself is thinner than that made by the tame bee—so delicately thin that one can scarcely touch a piece of it without crushing it, a mere film of dark wax. The color of the honey itself is like that of sugar cane molasses.

We ate what I thought was a great deal—more than I had ever consumed with the accompaniment of waffles or corn cakes—and I recommend to all novices in atavism that if they wish to enjoy their wild honey properly they eat it from the tree, picking up the comb in their fingers.

At the end of the venture we found that Bill had calculated correctly. There were about three gallons of honey, comb and bee bread in the cavity, although the honey alone did not make more than half that.

It was piled into a bucket which Ben picked up. Then we all rose and stood looking at one another, realizing that our occasion was over. There was nothing more to do, so we gathered up our belongings and once more took the trail.

My father and I went first. Then came Ariel. After him came his spouse, Jawn next and so on, down to the last, the two little girls and Elma and her baby. Our ways did not lie long in the same direction. We soon came to the forks, where the family was to turn down toward its home by the run—a four-room shanty—and my father and I to keep on along the slope. I had a small glass jar of the looted honey. That was for sentiment's sake. It was understood tacitly that they were to keep the rest. As my father murmured to me, "They don't often get anything that's sweet."

We said the most formal of mountain farewells to each other. The camaradie which we had known as we dipped our fingers into the honey tree was gone. Mrs. Coe urged me—repeatedly, as mountaineers do, to give conviction to the invitation—to "come over and set" with her some day. Bill acquiesced, the young men nodded slightly and gravely. Elma looked at me, her great eyes wholly without expression, and vaguely repeated her mother's formula. Then they took their trail and we took ours. We walked a little way in silence and then my father said suddenly, rather gruffly too, for him, "Well, how d'ye like it?"

"Oh!" I told him, "I liked it a lot."

We walked a little farther and then my father growled, with something ever so faintly elegaic in his growl, "Bill's a good man. He's honest. But I wouldn't put anything past those boys of his. That girl too—. But old Bill—he's an honest man."

We had not gone far when I remembered that I had left my vanity case behind. I knew at once where it was; it would be lying on the log where I had sat with Mrs. Coe. Telling my father to wait, I hastened back along the trail, but there was no vanity case to be found—only the fallen tree, the mulcted bees buzzing over it, somehow in the forest silence terribly disheartening.

I fled away, but at the forks I yielded to a sudden whim and turned down the trail of my vanished neighbors. One goes softly in the hills, my tennis shoes made no noise at all on the damp earth. In a moment I rounded a sharp curve and there caught my neighbors all unaware. They had not gone on to their home. They had halted, as soon, evidently, as they considered my father and myself at a good distance. They were standing and sitting about in a circle, the honey pail in their midst. One and all they were eating from it. Its level had sunk visibly. There would not be any left in a little while. They spoke and laughed in low tones. I could not hear what they said. Not for worlds would I have had them know that I had seen them. I tiptoed back out of sight.

I was almost beyond vision when I glimpsed something. Elma, who had been holding her baby, put it down, and gravely and simply took a shining object from her dress. She turned it thoughtfully in her hand, held it up and looked at it scrutinizingly. It was my vanity case. It seemed to satisfy her for, after another long look, she opened it and powdered her nose. Her mother and one or two of her brothers, seeing her, looked at the case, arrested for a moment, but for a moment only. I looked then, before going out of sight, for Bill, but I did not see him. He evidently had not tarried. The hoard was empty, and he had gone, alone. The leafy woods had swallowed him. Ariel had vanished.

Not often, I remembered, not often do we get anything that is sweet . . . when will I taste a piece of wild black honey again?

"MORE THAN BUILDING A DAM"

(Continued from page 438)

of life. If we can get working men to feel that way, their work is not just a job that has to be done throughout the day for money, but it is a great contribution to American industry. If we can get them interested in it so that they are enthusiastic about it, we shall have a new added resource in our national life. That is one of our jobs.

Many years ago, this valley had splendid forest in it. Most of it was cut away to make the land cultivable. Our hillsides were stripped of their forests because they would bring quick profits to somebody. Lumbermen bought land for from fifty cents to two dollars an acre from the people who lived there and hired the people to cut timber and strip it off the quickest way possible because it did not cost much; a quick turnover was what they wanted. And when the timber was gone, they left a population in a barren region. In some of those regions, the present state of population is pitiable, to say the least, a natural result of rugged individualism.

The rugged individualists, having taken what they wanted, have gone away and left a stranded population behind in desperate poverty. Now, it is up to the Tennessee Valley Authority to pick up the wreckage of rugged individualism and try to make a new industrial order there that can live in decency and reasonable prosperity. That is easy to say, but hard to do. There are still some forest lands remaining, and, if we handle these right, we can even now get large forest preserves. If we can establish a forest policy here of buying these lands, putting them under public ownership, some of them as Township Forests, some as State Forests, some as Tennessee Valley Authority Forests, and some as National Forests, it will take quite a number of men out of our unemployed class and put them into production that will be a source of permanent employment. That is one possibility.

Then we have other resources. We have a good many small deposits of a great variety of minerals in the Tennessee Valley; some of them are rather rare. Others are common, but can be worked only on a small scale. Iron production in this region died off because it could not compete with mines in Minnesota, but we have a pure iron ore here so lacking in phosphorus or sulphur that it will produce iron equal to the finest Swedish iron. It seems possible that we might revive some of these industries on a small scale, which could make their own products out of the equivalent of Swedish iron.

We have actually hundreds of deposits of manganese, low grade ores in broken deposits, not big enough for large working. From twenty per cent to thirty per cent of our manganese is imported and if we can develop technical methods of conditioning and concentrating these ores, we may have industries enough to keep ten to twenty thousand men busy. We are studying the possibilities of electrically fired ceramics. For the past few years all Europe has been producing electrically fired ceramics. The costs are lower and the production much better. With cheap power, with remarkable deposits of feldspar, clay, kaolin, we have all the raw materials, and sufficient population to do the work, to bring the ceramic industry from foreign shores and make its headquarters here in the Tennessee Valley. There is a great variety of other possibilities.

We have here a population that has not been combed over the way the populations of some northeastern states have. When you go into the rural districts of the North and East, you may find that the ablest men went off to the cities a generation ago. In some localities you will have a hard time finding quality enough to revive rural economy. Here in the Tennessee Valley the situation is different. Because of isolation, there has not been an economic opportunity for young men. There is good quality all the way from the top to the bottom. One of the key men in our organization recently was speaking about the incidence of intelligence in the Tennessee Valley organization and said he believed that so far as sheer intelligence was concerned, there was no place where it was more in evidence than in the labor forces at Norris Dam.

This country lives on agriculture to a large degree. Three-fourths of the population of the Tennessee Valley is rural, and yet its agriculture is in a non-agricultural region to a great extent. Here the agriculture should be to feed people and not to make money by selling produce. We ought to have a great variety of industry here that would be supplying us with the manufactured things we need, and our farms ought to be supplying us with the food we need. We have all we need to accomplish that. There are about six and one-half million people in the mountain region surrounding the Tennessee Valley, and in this region farming ought to be a secondary occupation, and not the main occupation that it is now.

We have raw materials, we have a fine population, we have timber, cheap power, minerals, pigments, ceramic materials—all these things. One of the prime purposes of the Tennessee Valley Authority, as I see it, is to try to create a new economy out of all these raw materials and this virile population. I do not call that regimentation; the people here do not call it that. They want an opportunity; they do not have to be driven to do these things; they are eager to do them. What we want to do is to furnish opportunity without compulsion.

I hope we can rebuild the economy of this region—so rebuild it that the ownership and actual workmanship shall reside in the same community, the kind of prosperity that has roots in the soil and is not easily dried up. We are trying to do that through cooperatives, trying to find out how to do it. We are on an uncharted sea to some extent. We are thinking about it, lying awake at night thinking about how we can take the remnant of resources here, that fine population and cheap power; how we can so work out an industrial organization that the people will be producing wealth that is here, paying for the Federal Government investment, but otherwise getting the results of their own labor and using that to raise themselves to a higher level socially and economically.

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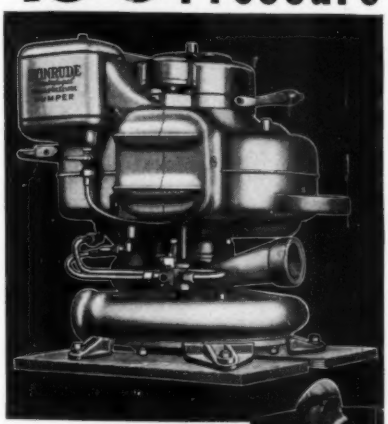

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TREES OF THE HERMITAGE

(*Continued from page* 470)

ing the Revolutionary War. Nature had graciously added a handle to the goblet, which was sent to the Hermitage from Long Island.

Uncle Alfred, as picturesque guide and oral historian, kept memories of "Old Hickory" very much alive at the Hermitage for more than fifty years after his master's death. He was born on the place and lived there his entire ninety-eight years. At his death he was buried where he often expressed a wish to lie at last—near the row of hickory trees at the foot of his master's tomb.

The Hermitage has been better preserved than most homes of that early period, because it was never occupied by any one except the family of the adopted son after President Jackson's death. Andrew Jackson, Jr., sold the estate to the State of Tennessee just before the Civil War. The State later gave control of it to the Ladies Hermitage Association and it has been handled much as the Mount Vernon estate is handled. Because of the watchful and tender care given the gardens and lawns their plants and flowers have not been ravaged by souvenir hunters. Though thousands make the pilgrimage to the Hermitage, it is with a spirit of reverence as to a shrine—sacred not only to the glory of the man,—the soldier and the President, but to the love he brought to this home and to the woman who meant more to him than life.

PROBING THE RED MAN'S PAST

(*Continued from page* 460)

over the face and firmly cemented to the bottom part. These shells were evidently used also as a medium of exchange by early Indians in long canoe trips from the Gulf, a sort of "shell standard" as it were. Within the Norris Dam reservoir, near Knoxville, Tennessee, as well as the Wheeler Dam region, are hundreds of prehistoric shell heaps and caves. Some of the former represent the accumulation of a thousand years of habitation and contain millions of tons of shells and bones.

The site of an early Cherokee fortified village has been unearthed near Caryville, Tennessee. After foundations of the tribal temple, council room and a portion of the stockade had been brought to light, further excavation below the level of the hard-packed clay floor revealed the foundation of a still earlier temple and occupancy. These are the first temple sites of that nature found east of the Mississippi River. The upper temple foundation measures about thirty by forty feet. There is a raised baked clay altar with a fire pit in the center. The walls of this building were thatched and about ten feet high. The roof was made by bending the tops of the young trees, that formed the wall, inward toward each other and binding them together, thus forming an arched roof. This, too, was thatched.

A semi-public building which stood near the temple was of the same construction, but had a flat fire pit rather than a raised altar. Adjacent was a private dwelling, typical of the dozens that must have formed the village. This covered a space of approximately eighteen by fifteen feet and was constructed of much smaller poles. At the edge of one wall is a raised clay dias which evidently served as a seat for the head of the house. In the center is a small fire pit.

The post holes marking the location of the stockade indicate that tree trunks at least ten inches in diameter were used in the forti-

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fications. This huge fence took abrupt right-angle turns occasionally so that the face of the stockade could be protected by a crossfire of arrows. The gateway had a protecting wall of poles in front in order that no person entering or leaving would be in a direct line of fire from an enemy. It is thought that this Caryville site may be the Cherokee fortress that Colonel Montgomery saw and thought too strong to attack during his Colonial campaign.

The Cherokees built many towns throughout Tennessee similar to the walled villages of the Iroquois in the North. At one time a member of the Iroquois union of tribes, the Cherokees seceded from the Great League and migrated southward. In the Southland they remained, a group of settled agricultural people surrounded by less civilized nomadic tribes. Their structures, intricate religious ceremonies, and compact political organizations bear out the traditions of their Iroquois forebears, whom the archaeologists have termed "the Romans of the North American Indians."

Some forty explorations have been made in the vicinity of Norris Dam, revealing nine different civilizations. Copper ceremonial objects of rare design have been found in some of the mounds. A series of open-front caves divulged many artifacts and eight skeletons. The latter were found in a completely flexed position resting in ash-filled hollows lined with bark. About the bones hung the remnants of a roughly woven twine fabric in which the bodies had been wrapped.

Major W. S. Webb, head of the department of anthropology of the University of Kentucky, is in charge of all TVA probings in the Valley.

AUTUMN COLORS

(*Continued from page 477*)

carefully, we see that this falling off takes place when the leaves have finished their work on the tree, or when the fruit and nuts have developed to maturity and no longer need the food supply provided by the tree. In other words, Nature sees that they no longer need to stay on the trees, so she cuts them off and starts them on a new career. And Nature cuts them off from the branches so quietly and so surely! If we examine a leaf which has just fallen, we note that the end of the stem which was attached to the tree is smooth. This indicates that the leaf was not torn from the tree. If we examine the twig of a tree just after a leaf has been separated from it and fallen to the ground, we see a smooth, round scar. Neither the leaf nor the tree twig shows signs of any tearing when the leaf fell off.

Obviously nature has provided some sure way for cutting these leaves off without tearing or injuring the tree. Look at the base of a leaf stem before it has separated from the tree, and you can see by the use of magnifying lenses that a thin plate of different kind of material is developing.

This thin, cork-like plate is between the base of the leaf and the tree. A little later there are two or more plates instead of just one. They are all tightly stuck together. Then suddenly the little plates seem to lose their hold on each other, and they fall apart. This completely separates the base of the leaf from the tree; and the result is that the leaf falls to the ground.

Then what becomes of those two or more little plates which grew between the base of the leaf and the tree? They serve another purpose besides cutting the leaf off the tree. One remains to cover the wound

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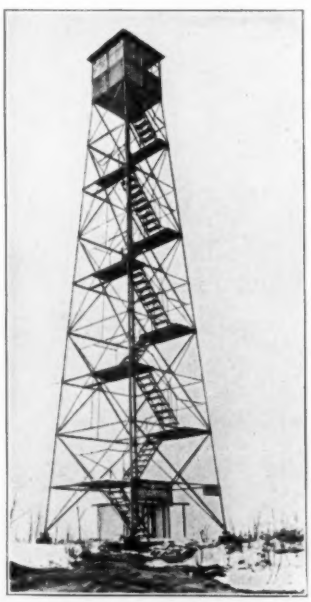

Courtesy Penna. Dept. of Forests and Waters.

FIRE TOWERS

THIS 60-foot tower, erected in Elk County, Pennsylvania, is one of the many **Aermotor** fire towers which are found all over the forest regions of the United States. The Aermotor Company, years ago, designed and made the first galvanized steel towers for forest protection purposes. **Aermotor** towers have been found to be so well suited to the purpose that they are used almost exclusively. They are strong, durable and safe to climb. The prices are surprisingly low.

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on the tree, and the others remain on the base of the leaf. It is really one of these little plates which we see when we examine the base of a fallen leaf, or the scar on a twig. The plate which covers the twig scar prevents the scar from "bleeding," or losing sap, after the leaf has fallen.

Of course, the next question is "What makes these little plates appear when they do?"

The answer is that these plates are formed while the leaves are still green. But they stick together tightly, and the leaves can not fall off. Then, when certain conditions arrive, the plates separate, and the leaves fall to the ground.

What are some of the conditions which will make these plates separate? The most common conditions which cause it are: low temperature, reduced light intensity (less sunshine), and dry weather. Disease or insect injuries to the leaf frequently produce the same effects.

You will remember that these are practically the same as the conditions which cause the leaf to change color in the fall. This is why the change of color and the falling of the leaves takes place at the same season of the year. The colors usually change first, and then the leaf falls. This is Nature's order.

There are some trees whose leaves neither change color nor fall off in the fall. These are the evergreens which everyone has seen. They seem to be able to stand sharp weather changes, even freezing and thawing, and still keep their green color and retain their needle-like leaves. In the South, the magnolia, rhododendron and holly are also evergreen.

THE ROLE OF FORESTS IN THE TENNESSEE VALLEY

(*Continued from page* 473)

fire prevention and road and trail construction. Two T. V. A. forest nurseries, one near Knoxville and one at Muscle Shoals, are being developed to supply planting material for the work, and a program of reforestation of critical erosion lands owned by the Tennessee Valley Authority has been planned.

In addition to the work of the camps, the development of tree crops is being undertaken, a tree crop nursery having been established near the the town of Norris. In this nursery suitable crop trees are being grown and experimental tree crop orchards and sample plantings have been made. The best types of walnuts, pecans, hickories, persimmons, papaws, wild cherries, hazels and berry bushes are being tried out. These will be scattered through the forest plantations as well as on special tree crop developments. Blight-resistant Chinese and Japanese chestnuts have been imported and planted and experiments in their establishment are under way. Altogether, edible tree crops for man, beast and bird are being developed as part of the forestry and soil erosion prevention program.

The systematic study of the forests of the Tennessee Valley—exactly where they are, how large they are, what they contain, and what they might best be used for—has never been made. All information so far available is quite general. This being the case, the T. V. A. is particularly concerned with the study of the larger aspects of the forests of the Valley and of the possibilities they offer in the development of a better economic situation for the people of the basin. Cooperating closely with the land planners of the Tennessee Valley Authority and with the United States Forest Service, the Division of Forestry has embarked upon a comprehensive study of the Valley's forests, of its wood-using industries and of the potentialities of both for permanent human betterment. Following the completion of these studies and the careful review of the data secured, further plans will be made for forest development on a permanent basis.

Under the second general class of activities mentioned, the Division of Forestry is much interested in the movement to increase National Forest acquisition in the Valley, and especially in expanding and developing State Forests in the seven states of the basin. A study has been made by the T. V. A. of tax delinquent lands with the expectation that it will assist in the establishment of State Forests. The Tennessee Valley Technical Forest Council has been organized, composed of a representative from each of the seven State Forest Departments, the United States Forest Service, the National Park Service, the Forestry Department of the United States Bureau of Indian Affairs with the Chief Forester of the T. V. A. as Chairman. This Council will work for the interests of forestry and conservation throughout the Valley. In addition, the T. V. A. Division of Forestry is cooperating with the Soil Erosion Service of the Department of the Interior in erosion matters, with the sportsmen and state game authorities in regard to wildlife, and with the United States Bureau of Fisheries in things related to fishing as a sport, a source of food supply and an industry.

Planned use of electrical power, soil, forests and the other resources of the Tennessee Valley in the interest of the general population is the basis on which the T. V. A. rests.

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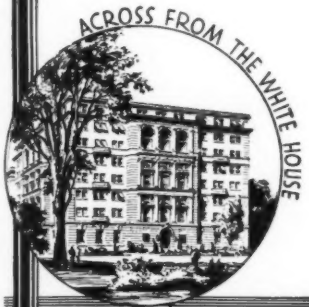

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Osceola's Canoe at Century of Progress

The Cypress Exhibit at the Century of Progress Fair has been enriched by the receipt of the century-old canoe—hollowed out of a twenty-four-foot cypress log by primitive methods—used by Osceola, great chief of the Seminole Indians, in his campaign against the whites which ended with his capture at St. Augustine in 1837. The canoe was secured by Ben R. Ellis, who manages the Cypress Exhibit for the Southern Cypress Manufacturers Association, from Cory Osceola, grandson of its first navigator and present chief of the Seminoles, at the expense of no little difficulty and adventure.

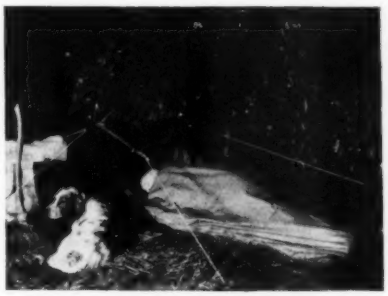
Negotiations had to be carried out in the fastnesses of the southern Florida Everglades where the Seminoles, who never surrendered nor made peace, have secluded themselves. Another difficulty arose from the fact that the Seminoles accord their women equal rights with the men—a unique custom among Indians. It developed that the women of the Osceola family were loath to part with this ancient family relic, but the deal was finally made, with the result that visitors to the Chicago fair may now view the canoe.

Original Chiseler Revealed by Park Service

One of the earliest instances of chiselling on record, says the National Park Service, is to be found in the Petrified Forest National Monument in Arizona. Completion of a P. W. A. project has revealed chiselling done by Indians in prehistoric times who used sharp stone implements to incise upon the cliff-sides their impressions of the world around them. The results are primitive drawings and symbols that constitute one of the most remarkable examples in America of prehistoric art.

Despite their fascination and challenge to the imagination these inscriptions heretofore have been admired by comparatively few visitors to the Petrified Forest because of the inaccessibility of their location. With P. W. A. funds, however, the National Park Service has overcome these difficulties during the past summer by building foot paths and a series of rustic stone steps which conduct the tourists safely and easily to the bottom of the cliff where original chiselers did their work.

Newspaper Rock, a mammoth boulder, approximately forty-four by twenty-five by thirty feet, is covered on all four sides with petroglyphs—some of human figures, some of animals and some of symbols evidently designating clans. Another fork of the trail winds among the boulders and, crossing the waterways on rustic stone culverts, leads to the "Origin of Life Cave," depicting crudely stages in the reproduction of the human species.



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THE STATE OF THE SOIL

(Continued from page 446)

examples can be seen in Meigs County. An approximation of this condition obtains to some extent also on the limestone lands, certain types of which once were as good as any upland in eastern United States. Generally, however, the smoother limestone soils have not suffered as much as the shale lands. Notwithstanding soil differences, erosion is in some degree an impoverishing process on all the sloping cultivated soils of the Tennessee watershed. Moreover, the exposed subsoil usually is more difficult and costly to plow, and the evidence points to a markedly increased rate of runoff, due to exposure of the dense, less absorptive clay.

With respect to sheet washing, the limestone valleys and parts of the associated ridges have suffered probably as much as any other part of the nation. Some of the valleys, including those occupied by formerly rich limestone soil, have been stripped of the surface layer over practically one hundred per cent of all land except that of the flat alluvial strips immediately bordering the streams. Reconnaissance surveys indicate that over many parts of the Tennessee watershed sheet erosion has advanced to a stage somewhat worse, as measured by depth of soil removal and relative proportion of cultivated land, than in any other part of the United States, with the possible exception of a few areas of Kentucky, southern Ohio and certain sections of the Piedmont Plateau and the Red Plains region.

With respect to the use of land over a large area within the Tennessee watershed, methods as extensively practiced today probably are little better, if any, than those practiced by early Colonial farmers of the tidewater sections of Virginia and Maryland. Slopes are still being cleared for a few years of cultivation with the intention of abandonment as soon as the soil has washed off, and of then clearing new land to be subjected to the same process of irreparable waste. This procedure can be seen, for example, in places all along the slopes of Clinch Mountain and other high ridges running through the Valley of East Tennessee. It has been accentuated locally in some degree since the recent introduction of large-scale tobacco production and with the intensified movement from town to country recently taking place in some localities. This new pioneering unquestionably will result in relatively more soil depletion than took place during the pioneering of the early settlers, since it necessarily is concerned with less favorable soils, steeper slopes and land made more erosive through the agency of past erosion.

A distressing aspect of the situation is that so little is being done to counteract this rapid march of land depreciation and denudation. Many farmers of the region confess that the trend must be changed if the remaining better agricultural lands are to be saved, but these broader-visioned citizens seem to be in the minority. Not a few insist that there is little the individual farmer can do to better the situation, since practical methods of erosion control have been given very little attention with respect to regional application. Certainly there must be profound changes in land-use to adjust practical methods of soil conservation and farm procedure, to the diverse lands and slopes, their adaptabilities and their individual needs. Much steep land, especially of the highly erosive types, must come out of cultivation, and the more arable areas must be given adequate protection by proper strip cropping, soil-saving rotations, stabilizing cover crops and so on.

Not only must these things be done to save the very body of the soil, but they must be done also to reduce the hazards of floods and the silting of stream channels and reservoirs. Here many of the soils are more erosive than those of the Piedmont country east of the Blue Ridge Mountains, where numerous reservoirs have, within forty or fifty years, been filled with the products of erosion to the very tops of the dams as, for example, the reservoir at Converse, South Carolina. There can never be anything approximating permanent flood conrtol, or any material reduction of the evil of silting until erosion is put under control from the very crests of ridges down across the slopes, where floods really originate and where silt loads are picked up, to the banks of streams.

After all is said, it is erosion that constitutes the real American crisis in land use. The step that inevitably must be taken to control the devastating agency of erosion, and the causative process of speeded-up runoff, is the application of a coordinated land-use program, applied in accordance with the specific needs and adaptabilities of every acre of land within watershed areas. There can be no alternative. The seeking of one will mean merely the putting off of doing those things that must be done, with a more difficult and costly job put off into the future.

TREE CROPS FOR TENNESSEE VALLEY FARMS

(Continued from page 475)

cooler mountains. When hazels such as those reported to me are developed for general propagation, they will furnish a valuable crop for the owner of hogs, supply mast for wild life and may provide a nut crop for sale in the local market.

The honey locust, like so many other sources of tree crops is considered a weed tree. Cattle, hogs, opossums and all manner of wild life seek out these "sweet-bean" trees and feed on the fruit, but little thought has been given to the real worth of their pods for cattle food. Analysis of one variety shows a sugar content higher than the sugar beet and food value greater than that of corn. Honey locust is a legume and accordingly stimulates grass growth. At the same time the crown shades and protects the grass against the intense summer sun. Thus blue grass and honey locusts offer two crops on a single piece of land, provide feed for sheep and cattle, and fill an important place in holding the mountainside soil.

The few plantings of crop trees that have been made in this country together with European experience gives evidence that this form of agriculture can be made to play an important part in the future agriculture of the Valley. A setting of several acres to mulberry, persimmon, papaw, wild plum, thin-shelled hickory, pecan, hazel, and several varieties of oak will prove worthwhile on many farms. Their crops may be harvested by hogs or chickens, may encourage an increasing amount of wild life, or may be collected and carried to market to help out the cash income of many a farm home. By using superior varieties of trees more profitable crops can be grown and the cost will be little compared to the cost of cultivating fruit or maintaining plow. land crops. Meanwhile, erosion will be held in check and the natural balance of bird and animal life will be encouraged.

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"WHO'S WHO" AMONG THE AUTHORS IN THIS ISSUE

Arthur E. Morgan

ARTHUR E. MORGAN (*More Than Building A Dam*) is Chairman of the Board of Directors of the Tennessee Valley Authority, President of Antioch College, and President of the Dayton-Morgan Engineering Company. He is widely recognized as the chief engineer of the Miami Conservatory District, designed in 1913 to prevent recurrence of the Dayton flood, and of the Pueblo Conservatory District to protect Pueblo, Colorado, from floods. Dr. Morgan is the author of several brochures, among them, "Education—The Mastery of the Arts of Life"; "New Light on the Boyhood of Lincoln" and "What is College For?"

JOSEPH C. KIRCHER (*National Forests in the Tennessee Basin*) is Regional Forester of the Southern Region of the United States Forest Service, with headquarters at Atlanta, Georgia. This region includes fourteen National Forests in the states of North and South Carolina, Georgia, Florida, Mississippi, Louisiana, Oklahoma, Texas, Tennessee, Alabama and Arkansas. Mr. Kircher received his degree of Master of Forestry from the Yale Forest School in 1909, and entered the Forest Service that year. He was Regional Forester of the Eastern Region, with headquarters at Washington, D. C., from 1929 to July, 1934, at which time the Region was divided.

H. H. Bennett

H. H. BENNETT (*The State of the Soil*) is Director of the Soil Erosion Service of the Department of the Interior, located in Washington, D. C. He attended the University of North Carolina and after graduating, taught chemistry there for several years. He has long been engaged in scientific and practical studies of the soils of this and other countries and has made surveys in Alaska, Panama, South America, and Cuba. He is the author of the book, "The Soils of Cuba," which has attracted attention throughout all the sugar-producing countries of the world.

JOHN W. HERSHEY (*Tree Crops for Tennessee Valley Farms*) is Tree Crop Specialist for the TVA. Becoming interested in the work of tree crops and nut tree propagation, Mr. Hershey started a nursery of his own in 1923 near Downington, Pennsylvania. He has been active in the Northern Nut Growers Association and Secretary of the Pennsylvania Nut Growers Association.

MARY F. ANDERSON (*Trees of the Hermitage*), a native of Nashville, Tennessee, received her B.S. degree from the University of Tennessee and her M.A. from American University. She was formerly a teacher of American History and Economic Geography in Virginia high schools. She now lives in Washington, D. C., where she spends a good deal of her time writing feature and magazine articles.

E. C. M. Richards

EDWARD C. M. RICHARDS (*The Role of Forests in the Tennessee Valley*) is Forester for the TVA. A graduate of the Yale Forest School, he has served as consulting forester on properties throughout the eastern and southern states. Much of the time during 1917 to 1919, Mr. Richards was in Persia with the Near East Relief, where he observed the age-long destructive influences of lumbering and unrestricted grazing. This was followed several years later with travel to study forest activities in many European countries. He looks upon the TVA project as a great sociological experiment in which forestry plays a basic part.

ARCHIBALD RUTLEDGE (*Babes of the Wildwood*) lives in Mercersburg, Pennsylvania. A native of South Carolina, he has for many years written articles and poems dealing with his beloved "low country" along the Atlantic Coast. Some of his best known books are "Children of the Swamp and Woods," "Days Off in Dixie," and "Peace in the Heart." Mr. Rutledge is a frequent contributor to AMERICAN FORESTS.

MARY CARTER ROBERTS (*Mountain Ariel*) lives in Washington, D. C. At present she is engaged in editorial work at the Bureau of Indian Affairs, Department of the Interior.

JOHN PHELPS (*Invitation*) is a poet of New England and lives at Northfield, Massachusetts.

Carlos C. Campbell

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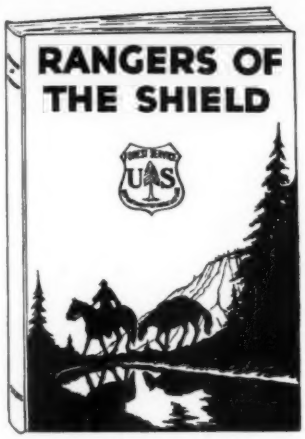
JOHN HARVEY FURBAY (*Field and Forest for Boys and Girls*) is Director of Nature Education at the College of Emporia, Kansas.



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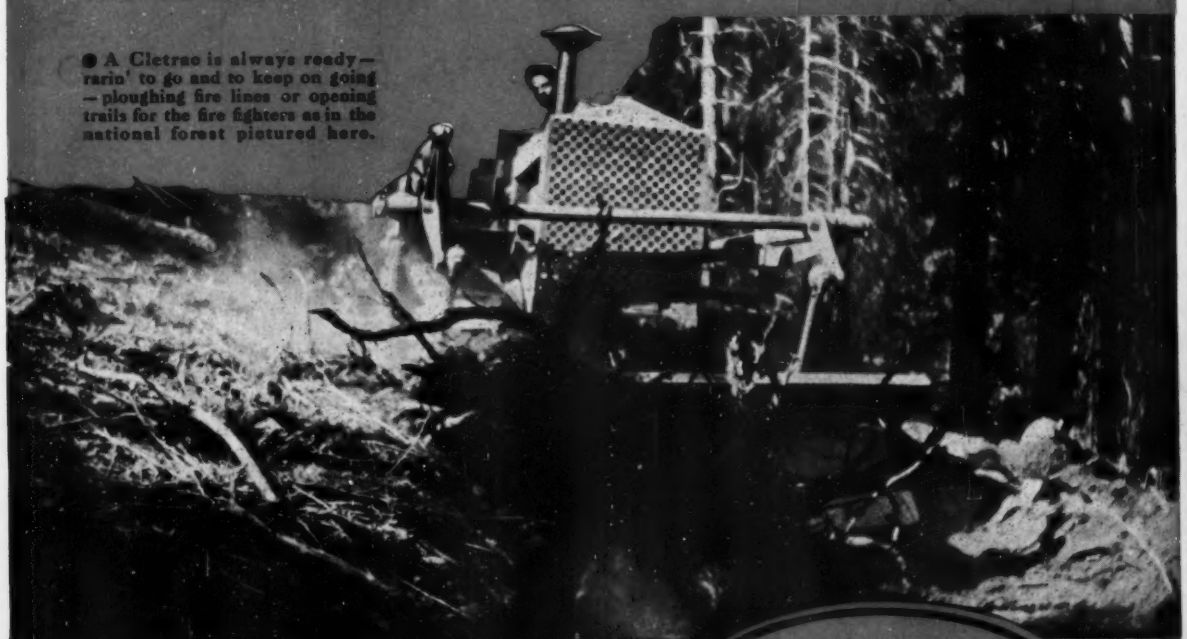

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